When it's gas piping equipment
. . . It's CRANE for complete selection

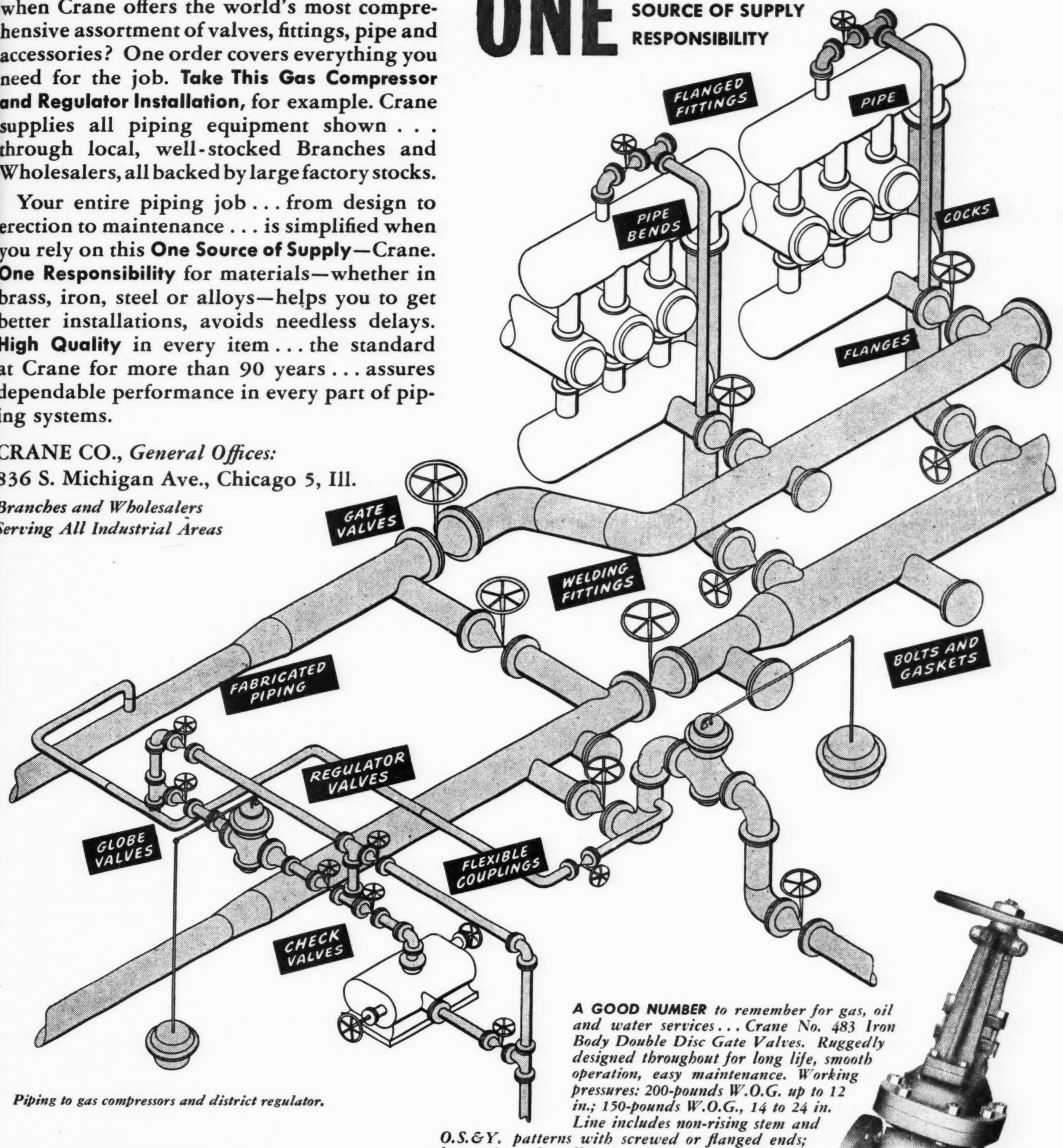
Why spend time hunting for piping materials when Crane offers the world's most comprehensive assortment of valves, fittings, pipe and accessories? One order covers everything you need for the job. **Take This Gas Compressor and Regulator Installation,** for example. Crane supplies all piping equipment shown . . . through local, well-stocked Branches and Wholesalers, all backed by large factory stocks.

Your entire piping job . . . from design to erection to maintenance . . . is simplified when you rely on this **One Source of Supply**—Crane. **One Responsibility** for materials—whether in brass, iron, steel or alloys—helps you to get better installations, avoids needless delays. **High Quality** in every item . . . the standard at Crane for more than 90 years . . . assures dependable performance in every part of piping systems.

CRANE CO., *General Offices:*
836 S. Michigan Ave., Chicago 5, Ill.

Branches and Wholesalers
Serving All Industrial Areas

ONE STANDARD OF QUALITY
SOURCE OF SUPPLY
RESPONSIBILITY



Piping to gas compressors and district regulator.

***A GOOD NUMBER** to remember for gas, oil and water services . . . Crane No. 483 Iron Body Double Disc Gate Valves. Ruggedly designed throughout for long life, smooth operation, easy maintenance. Working pressures: 200-pounds W.O.G. up to 12 in.; 150-pounds W.O.G., 14 to 24 in. Line includes non-rising stem and O.S.&Y. patterns with screwed or flanged ends; brass trimmed or all-iron. See your Crane Catalog.*

EVERYTHING FROM . . .

VALVES • FITTINGS
PIPE • PLUMBING
AND HEATING

CRANE

FOR EVERY PIPING SYSTEM

ADVERTISERS

Aluminum Co. of America	—
American Meter Co.	10, 11
American Radiator & Standard Sanitary Corp.	54
American Recording Chart Co.	62
Anchor Petroleum Co.	63
Automatic Products Co.	60
Barrett Division	—
Beacon Petroleum Co.	—
Blaw-Knox Co.	—
Bowser, Inc., Incineration Division	70
Caloric Stove Corp.	—
Cast Iron Pipe Research Association	8, 9
Chaplin-Fulton Manufacturing Co.	12
Cleveland Trencher Co., The	—
Connelly, Inc.	—
Cooper-Bessemer Corp., The	91
Crane Co.	1
Detroit Brass & Malleable Works	—
Detroit Lubricator Co.	71
Detroit-Michigan Stove Co.	65
Dowell, Inc.	81
Dresser Industries, Inc.	6, 7, 59, 85
Dresser Manufacturing Division	6, 7, 85
Empire Stove Co.	57
Fisher Governor Co.	16
Fluor Corp., Ltd.	—
Gasair Associates	—
Gas Machinery Co., The	21
General Controls	Third Cover
General Gas Light Co.	—
Goldak Co., The	94
Greenlee Tool Co.	—
Hamilton Manufacturing Co.	—
Handbook Butane-Propane Gases	67
Hardwick Stove Co.	13
Hays Manufacturing Co.	72, 73
Heatbath Appliances, Inc.	50
Heath Tree Service, Inc.	75
Henderson Furnace & Manufacturing Co.	68
Hydrauger Corp., Ltd.	—
Jaeger Machine Co., The	74
Johns-Manville Corp.	—
Kaiser Steel Corp.	—
Koppers Co., Inc.	—
Master Tank & Welding Co.	89
Milwaukee Gas Specialty Co.	—
Minneapolis-Honeywell Regulator Co.	—
Mueller Co.	—
National Tube Co.	—
Natural Gas Odorizing Co.	22
Nordstrom Valve Division Rockwell Manufacturing Co.	4, 5
Norton-McMurray Manufacturing Co.	58
Norwalk Valve Co.	74
Oilwell Supply Co.	—
Oronite Chemical Co.	—
Pacific Gas Corp.	70
Peerless Manufacturing Corp.	66
Perfex Corp.	69
Phillips Petroleum Co.	3
Pittsburgh Equitable Meter Division Rockwell Manufacturing Co.	Front Cover, 14, 15
Porter Co., Inc., H. K.	24
Reliance Regulator Division	Second Cover
Reynolds Gas Regulator Co.	67
Robertshaw-Fulton Controls Co.	—
Roots-Connersville Blower Corp.	59
Safety Gas Main Stopper Co.	—
Security Manufacturing Co.	61
Semet-Solvay Engineering Division	—
Servel, Inc.	53
Sharples Chemicals Inc.	26
Skinner Co., M. B.	78
Sprague Meter Co.	Fourth Cover
Stacey Manufacturing Co., The	66
Standard Pipeprotection, Inc.	—
Stauffer Manufacturing Co.	74
Superior Meter Co., Inc.	70
Titan Valve & Manufacturing Co.	—
Toledo Pipe Threading Co.	18
U. S. Pipe & Foundry Co.	—
United Petroleum Gas Co.	76
Vulcan Proofing Co.	64
Wachs Co., E. H.	—
Walworth Co.	93
Warren Petroleum Corp.	—
Welsbach Corp., The, Kitson Division	—
Western Supply Co.	—
White Products Corp.	—
Williamson Inc., T. D.	95

TP 700 G24

GAS

REG. U. S. PATENT OFFICE

A JENKINS PUBLICATION

Twenty-Sixth Year of Publication

January, 1950 CCA NBP **Vol. 26—No. 1**

COMMENT

Highlights 17

Thermally Thinking, *by Edward Titus* 19

Promotional Notes and Notions, *by Stanley Jenks* 23

Technical Trends, *by Guy Corfield* 25

ARTICLES

Mirror of 1949, *by Hugh H. Cuthrell* 27

New Plant Achieves Continuous Gas Generation 31

How to Make Plans for System Operation by Long and Short Term Forecasting, *by John B. Boniface* 32

Fratt's Hat Tricks Spark Seattle Round-Up 36

Gas Fume Incinerator Ends Plant's Objectionable Odors, *by Joseph William Baggs* 39

Using Natural Gas in a Manufactured Gas System, Part II, *by E. G. Boyer* 40

Economics of Elevating Gas Heating Value, *by Hall M. Henry* 42

GAS' Digests 47

Pipeline Section 77

1949—Boom Year for Gas Pipelines 79

Public Relations on the Pipeline, *by Bill Clark* 84

Oklahoma "Reclaimer" Eases Pipe Reconditioning Task 88

Pipeline News 90

DEPARTMENTS

Associations	52	Catalogs	64
Calendar	56	Sales Slants	66
News	56	New Products	68
People	62	Current Reading	75

PUBLICATION OFFICE

198 SOUTH ALVARADO ST., LOS ANGELES 4, CALIFORNIA • Phone DUNKIRK 7-4337

BRANCH OFFICES

CHICAGO, DAVID CARMEN, Manager, 1064 Peoples Gas Building, WAbash 2-2589
NEW YORK, JOSEPH M. DEMATTHEW, Manager, 11 West 42nd St., CHickering 4-1969
TULSA, CRAIG ESPY, Manager, 1341 S. BOSTON, 2-5726

EXECUTIVE

JAY JENKINS, President and Publisher JAMES E. JENKINS, Secretary Treasurer

EDITORIAL

BILL CLARK, Managing Editor
GUY CORFIELD, Technical Editor
EDWARD TITUS, Eastern Editor
TED SHIELDS, Assistant Editor
MARY LOU HANSON, Editorial Assistant
PAUL LADY, West Coast Editor
O. D. HALL, Mid-Continent Editor
FREDERICK L. DALTON, Art Director
ROBERT C. HORTON, Circulation Manager

GAS is published monthly by Jenkins Publications, Inc., 198 South Alvarado Street, Los Angeles 4, California. Subscription price, United States and possessions, Canada, Mexico, Cuba, South and Central American countries (in advance), 50 cents the copy; one year, $2.00; two years, $3.50; three years, $5.00. All other countries, $3.00 per year. Acceptance under Section 34.64, P. L. & R. authorized. Member: The Controlled Circulation Audit, Inc.; National Business Publications, Inc.; Society of Business Magazine Editors. GAS is indexed regularly by Engineering Index Inc. Publishers: BUTANE-PROPANE NEWS; Handbook BUTANE-PROPANE GASES; BOTTLED GAS MANUAL, WESTERN METALS.

Highlights

How was 1949? In the gas industry, the greatest ever—of course. Customers increased 2.5%, revenues 7.3%. Construction outlay totaled $943 million. Proved reserves advanced 7.9 trillion cu ft. The FPC gave final approval to the construction of 6474 miles of major pipelines costing more than half a billion dollars. The nation's longest and most costly line was under construction. At year's end, 8500 miles of line were under construction.

How about gas appliance sales? They were off from 1948's records, admittedly, what with the nationwide "recession" earlier in the year; but they closed with a rush, and easily outstripped pre-war marks.

What's ahead? In contrast to last year's pessimism over appliance sales prospects, GAMA members now forecast another record-breaking year.

For more lowdown on achievements in 1949 and predictions for 1950 turn to Hugh Cuthrell's annual report, starting on p. 27; GAMA's survey, p. 29; the pipeline report, p. 79; FPC pipeline approvals, starting on p. 80; and pipeline construction achievements, pp. 94-96.

How does the industry stack up against American business, as a whole? The amazing fact is that gas and electric utilities are the only components of American industry whose capital outlays in the last half of 1949 were higher than in the corresponding 1948 period, and whose anticipated spending in the first quarter of 1950 will be higher than in 1949's first quarter.

Other industries were down 14%, expect to be down 14% again in the first quarter. That's what the Department of Commerce and the SEC learned in a joint survey.

Hawaii to produce own make oil and LP-Gas. Honolulu Gas Co. has helped set up a new company which will buy heavy California crude direct and produce its own gas-oil and butane. (See p. 56.)

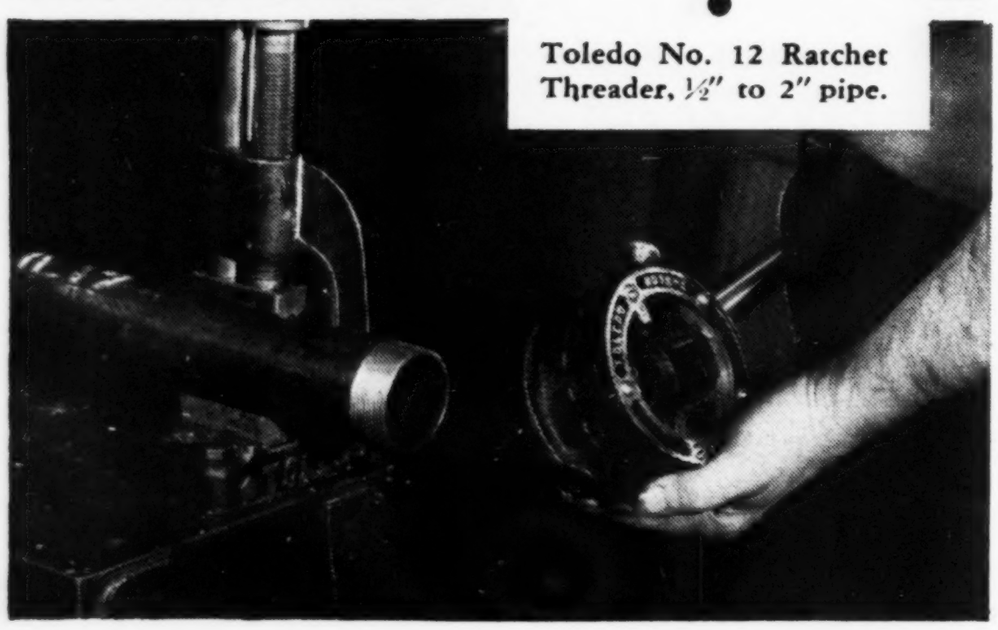
New England's natural gas prospects have been further complicated. Last month Eastern Natural Gas Corp., Washington, filed with FPC data on a $28 million line from Phoenixville, Pa., to Boston, but a few days later the company's attorney was quoted as predicting the application would be withdrawn. Connecticut, Massachusetts, and Rhode Island companies would have been served by the line.

That's not all. A bill has been filed in the Massachusetts legislature which would provide for a natural gas authority which would build and operate lines in the state. If approved, the authority would buy gas from whichever companies are selected to bring gas into the state and resell it to distributors. Cost, $40 million.

Top speed in the tight spots with TOLEDO ***RATCHET*** THREADERS

Toledo No. 11 Ratchet Threader, ½" to 1¼" pipe.

Toledo No. 00 Ratchet Threader, ⅛" to ¾" pipe.



Toledo No. 12 Ratchet Threader, ½" to 2" pipe.

IDEAL ALL-AROUND TOOLS TO SAVE TIME..CUT COSTS!

When the job calls for close corner work—it's a "natural" for Toledo Small Ratchet Threaders! These time-proven tools will save time for *you*—producing clean-cut, leak-proof threads . . . quickly and easily . . . in the most difficult corner job.

Because these tools are so compact . . . light in weight . . . and easy handling . . . thousands of better mechanics today prefer Toledo Ratchet Threaders for all-around use!

For any pipe tool requirement, you can't beat genuine TOLEDO equipment—hand tools or power. These are the tools that get the work done *faster, better* and at *lower cost!* The Toledo Pipe Threading Machine Co., Toledo, Ohio. New York Office, No. 2 Rector Street Building.

RELY ON THE LEADER

TOLEDO

FOR PRECISION PIPE TOOLS

EDWARD TITUS

THERMALLY THINKING

Which Way in 1950?

WE'LL try not to indulge in any of the usual old saws or wheezes in this editorial opening the year 1950, half way through the century.

What are the main trends ahead?

More and more sales of gas, for one thing. Large expansion of gas facilities. Tougher and tougher competition between gas and electricity (incidentally, word has gone out that high cost of installation of electric ranges is more and more of a setback to these ranges in some localities).

Turning to the general picture—

The main fact of interest to the gas industry and to many others in this mid-century year would seem to be:

Are we trending toward socialism?

If so, how fast?

And can we lick it?

The writer believes that we are trending toward socialism at the moment — but that strong forces are pushing in the opposite direction and that the trend can and will and must be reversed.

A highly alarming book is that of John T. Flynn, "The Road Ahead — America's Creeping Revolution."

The book tells, with abundance of supporting data, how the United States as of the present moment is trending in the same direction as Great Britain has trended — and indicates all this sort of thing may turn out to be just a mask for communism — state rule of everybody and gradual suppression of individual liberty.

Who's Flynn?

Flynn has been a smart expose man and analyst for many years. His works are usually backed by the most thorough proof and reaserch.

The book is not pleasant reading — But read it now, and then try some of the more pleasant books you got for Christmas, to settle your stomach.

Flynn points out that socialism came to England through a carefully schemed plan. The word socialism was not used. It proved easier to appeal to the labor unions if that word was kept out.

As of the present, Flynn holds that although Great Britain has nationalized only about a quarter of her economy,nearly the whole economy in effect has been socialized. As is well known, the gas industry is one of those taken over by the government. Information on the exact results of this phase of nationalization is trickling through. But it is too early to make any full appraisal.

In England, according to Flynn, workers are urged to "dedicate" their lives. Some are becoming a little restless at the dedication. Apparently there is considerable curtailment of freedom of work. Flynn reports that no man of ages 18 to 50 can change his calling with full freedom, and the same is said to apply to women of 18 to 40.

Two Kinds of Socialism

After thus reviewing the British situation, Flynn goes on to say that we do have a movement in this country corresponding to Fabian socialism in England. Don't, he says, mix up our so-called socialist party (which in general is freedom-loving) with the more powerful and more subtle socialist movement.

The socialism that Flynn is talking about would, if successful, lead to Washington's taking over practically the whole economy. The words Planned Economy are sometimes used for it, and Flynn maintains it should be renamed Planned Socialist Economy.

It could mean, he indicates, taking over by the government of insurance, transportation, credit, fuel, electric power, coal, and much of the land itself.

Flynn tells exactly who he contends are our Socialist Planners among civic groups (or call them pressure groups) and among government groups and certain labor groups.

Taking the electric industry as an example, he reviews the sought-for expansion of the TVA idea to other parts of the country. He maintains that the men behind such plans are a minority in the party in power who now have control of the party and its president.

Do we or do we not desire a socialist way of life? Flynn asks.

The planning goes on, and never is the word socialism used here any more than in Great Britain. What it is called consists of a lot of individual names for different trends, all of which have a lulling, desirable sound in themselves.

For instance, credit and electricity for the farmer, more business for various businesses, more homes, security and work for everybody, plenty of money, more and more of it (though worth less) for everyone—all guided by and bestowed from Washington.

Definite Program Needed

It is good there are people like Flynn to call these matters to our attention.

Flynn puts forward a program which on the whole is

good for combating the situation. The plan, however, needs plenty of further implementation. It is full of strong statements. But he doesn't perhaps get down enough into the actual know-how detail of how to get the work done.

It would appear desirable for members of the gas industry (also other industries and all patriots, including labor leaders and political leaders, who love the American way of life) to study this book—but don't stop there. Get down to the detailed know-how of how to beat the trends that Flynn reveals, and do it fast.

Knuckle Down

There are some parallels in all this to movements like the safety movement.

As Dr. Ned Dearborn, president of the National Safety Council, has often pointed out—also *GAS* and BUTANE-PROPANE *News* in their safety issues—it is one thing to yell against accidents, but it is something else to knuckle down and get on a committee, and influence one's friends and fellow employees to be safe, and really work out the know-how of how to be safe.

In like manner the prevention of state-dominated socialism, communism, or near-dictatorship requires work and know-how.

In the gas industry a beginning has been made. A study is under way of how to impart the economic facts of life. Under consideration are some charts and other methods of visual education. Nothing will be done of an anti-union nature. Nor will there be unfair influence on employees. But methods are being considered to present graphically what the American system with its high standards is all about.

The above naturally comes under the heading of employee relations, which industry has been talking about for years but which could stand some further development along the line of employee education as to fundamental economic principles.

Awakening Stockholders

In the field of stockholder relations, on the other hand, there is a surprising amount of work that could be done but is not being done today. Most companies not only could do more with stockholders for themselves, but also for the American way of life in general.

If a survey were made, it could doubtless be found that many stockholders, including perhaps substantial ones, because of ignorance of basic American economics are unwitting victims of propaganda of welfare and social planning groups who are advancing our Creeping Revolution. There have been many proved instances of wealthy contributors to fellow traveler groups allied with anti-American organizations.

In a few instances these contributors have done so with their eyes open. In other instances they have been led into the fold, and have made a contribution of time and money through devious channels in which the true purpose wasn't disclosed.

Mr. Flynn even makes the direct charge that many of those most powerful in directing the affairs of one of the largest combinations of church organizations in the United States are employing the machinery of this vast organization in a way that helps along toward a socialist revolution.

He asserts that congregations of a host of small and large churches throughout the country are thus helping to finance an effort aimed at a kind of nation most of them would not want.

Bearing in mind such situations, it is plain that in reaching out to its employees, stockholders and customers, the gas industry and others might well consider not only the comparatively selfish objectives like getting in proxies—but also something in the way of education on what we may be heading for if we don't wake up.

They're After You!

The New York *Daily News*, in an editorial on Mr. Flynn's book, put it this way:

> Mr. Flynn in this book names names, rips off disguises, exposes many a fake lover of the people, and cites chapter and verse. If you like the life you lead in the United States as of now, better read this book. They're after you. They're playing for keeps. They may get you if you don't look alive.

It is fortunate that some of the more progressive companies in the gas industry are becoming interested in knowing their stockholders better. Nearly every company for years has realized that they must make every effort to become acquainted with their employees. But it may be true that many managements, unless there was an important proxy fight on, have thought that stockholders were just a nuisance—the more they knew about the inside of the company, the more trouble they might make.

The several progressive companies in Texas and elsewhere who are taking greater interest in actually knowing their stockholders will be doing a great service, if in the course of cementing the shareholder to the company, they also read Mr. Flynn's book and figure out a program for enlisting these little-known stockholders in a program to combat American's Creeping Revolution.

Planks in the Platform

Nearly all these stockholders are influential in their communities. Nearly all would be against America's Creeping Revolution if someone would tell them what it is. Nearly all would fight the Creeping Revolution if someone would give them the word weapons and method weapons to do so. Only because they don't know what is going on—or if they do, don't know how to fight it, do they sit home and do nothing, or else become an actual victim of or contributor to some type of organization that Mr. Flynn says is aiding this revolution.

Incidentally, a definition of a stockholder relations program we have from an authority on the subject lacks one important plank. The program, according to this authority, should accomplish such objcetives as the following:

Acquaint banking and financial groups with headway of the company and the industry.

Build stockholder loyalty by informing them of the reason why the investment is sound.

Condition stockholders in such a way that they will stick with the company in the event earnings should decline.

Be prepared to answer opponents to management.

Build faith in management and receptiveness to suggestions of management.

End the sort of discontent that might add difficulties to the securing of additional financing.

The plank that is missing is something about keeping stockholders informed on how to combat the revolution that could happen here.

Don't think we're pessimistic. Quite the contrary. The Creeping Revolution is something that can and must be turned back at some point. This despite some so-called trend-finders in Washington, on both sides of the fence—who live in constant hope of more socialism and more bureaucracy—thus increasing their own importance and salary.

Recent election returns in Australia and New Zealand show the trend to the left does run its course and turn back after while.

STANLEY JENKS

PROMOTIONAL NOTES AND NOTIONS

Video Value

THE "CUFF NOTES ON TELEVISION," intelligently dispensed but definitely not cuffed around, at the home service breakfast at the AGA Chicago convention, particularly interested this corner, because, as an ardent televisionist, I can appreciate the promotional possibilities that television offers. While not enthusiastically endorsing the competitive appliance efforts on my screen, I have to admire the skill and perspicacity these manufacturers display in using the television medium.

They don't miss a bet. Glamor gals open refrigerator doors while the commercial spieler holds forth; or close-ups of the clock controls and multi-heat switches on electric ranges bring to the viewer a tempting familiarity with some "modern" development sadly lacking in her home.

Our home economists necessarily are limiting their television experiences to extolling the superiority of gas service in solving domestic problems. It is very worthwhile and a most essential activity, because our Mr. & Mrs. John Q. Public have to be taught to appreciate things these days.

However, our competitive deficiency in the television picture will still remain until there are gas appliance programs, sponsored by appliance maunfacturers who can enthusiastically and persuasively plug their products as a part of the program. Admittedly, this is something else again. Such a manufacturer must have the whole-hearted cooperation of the local gas utility. For example, he has the right to assume that gas utility salesmen will not be paid to take sales away from his dealers.

Television as an influential medium is the biggest thing that has come down the pike since radio discarded headphones. Its "commercials" have a persuasive reality beyond comparison with the artificial yappings of radio.

The older I get, the less prone I am to stick out my neck. But here goes. *Television ought to be part and parcel of our promotional plans from now on.*

Laundry Dryers

AS HAROLD MASSEY OF GAMA put it in his paper before the Residential Gas Section at Chicago, it is no compliment to the gas industry that the electrical models (laundry dryers) are outselling gas models today two to one, despite the fact that the gas type has every advantage over its electric counterpart. Mr. Massey, covering a lot of ground in a short time, listed these advantages and outlined a program to increase the sales of this desirable load-building appliance.

There is no question about the available market for a laundry dryer. Its need is more apparent today than it was 25 years ago, when some of us started the ball rolling and admittedly fumbled, maybe mostly because we could gain ground more easily forward passing with other more acceptable appliances.

Today's picture is different, and, while we are indebted to the competition for helping popularize the idea, it seems our solution—that is, equalling and passing electric laundry dryer sales—is primarily a matter of intensity of effort rather than anything else.

Through the years, the gas industry has done a remarkably good job of rising to the occasion. When we have needed anything badly enough, we have always found the ability to get it. As soon as the day dawns when gas company managements feel they just have to have that laundry dryer load without any more pussyfooting or fooling around, the industry will move in and take over.

The point is that many of us feel that the time to do this has already arrived. We have able manufacturers with fine products. We have first cost, operating cost, and installation cost advantages that make the field a promotional paradise. Maybe we are a little hazy still on the load value of the laundry dryer and the added protection it furnishes for more established loads. In other words, we are not completely sold, ourselves.

Anyway, this business of being outsold two to one in a field so obviously ours is more than uncomplimentary. It is positively insulting, when an all-out load-building effort is in the cards.

Tougher Customers

UNDOUBTEDLY YOU HAVE EXPERIENCED IT TOO. You hear a paper at a convention, and, despite the wealth of interest and pertinent information the paper contains, there is one phrase that rings the bell louder. It is generally pithy and packs a wallop.

President Hugh H. Cuthrell, at Chicago in his "Scanning the Planning for Sales" address before a general session, summarized the 1950 situation in one sentence. *The customer is tougher.*

As Mr. Cuthrell put it, 1950 will be a year when dollars are going to buy more and they are going to be harder to get. Supply has overtaken demand, the full competitive forces of our system will be in full swing, and the customer has a degree of independence almost on a par with his pre-war status. I say "almost" because there is one significant difference that tends to make him tougher still. Today, in addition to his personal needs, the customer has to provide for a tax drain on his pocketbook averaging approximately $360 per individual a year. The Truman track to the treasury is paved with deflected dollars that otherwise would be available to buy CP ranges, automatic water heaters, or a brand new gas refrigerator. Of course, the customer is tougher and will stay that way until he can be made to realize that voting for dependence on government is voting away his independence to spend the money he earns in any way he chooses.

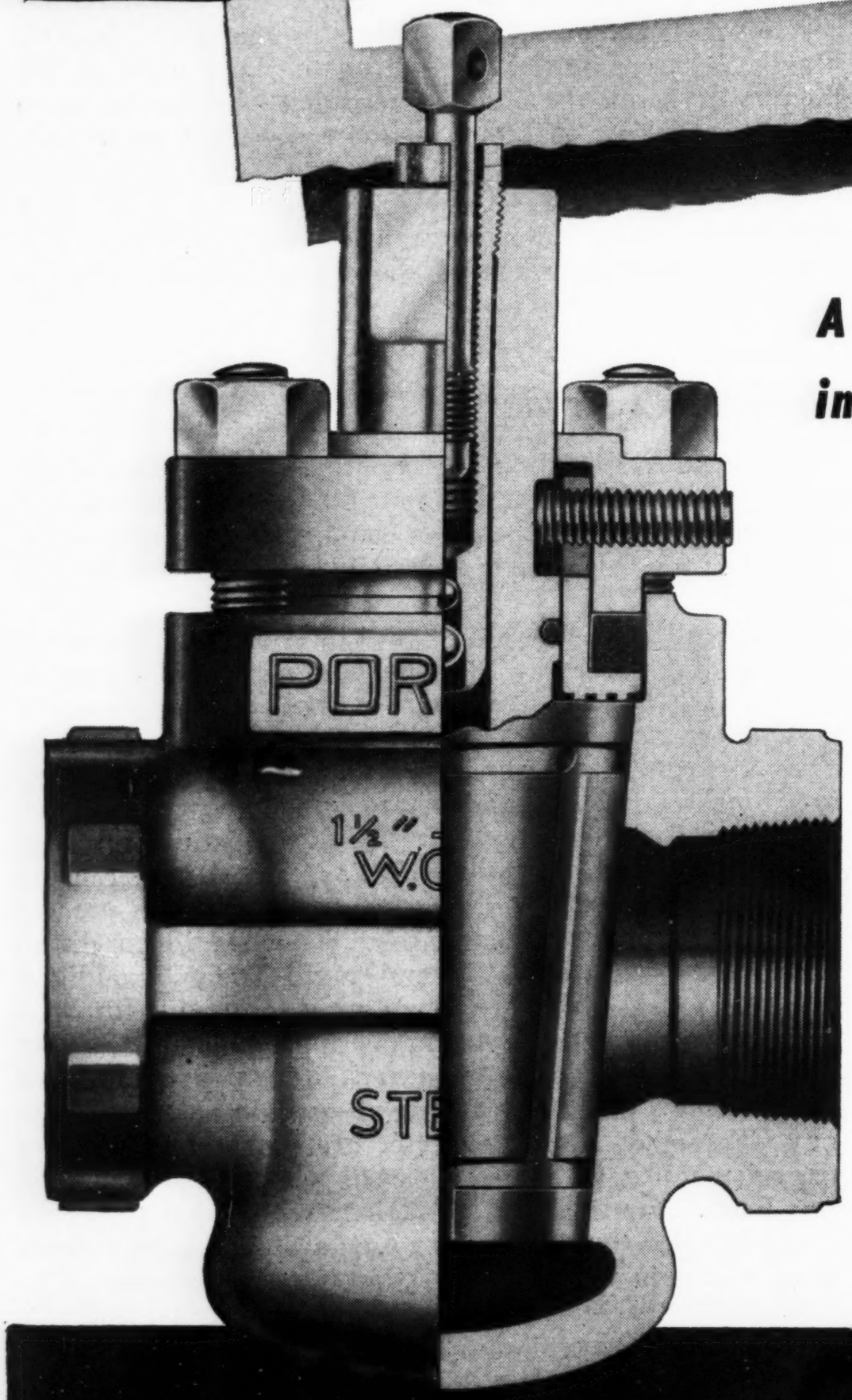
We who sell have a serious competitor—the tax collector—for the customer's dollar. It creates a serious promotional problem, and, as Mr. Cuthrell worded it, it calls for "a revival of interest, a revival of our sales forces, a revival of our program of dealer relations, a revival of good sales techniques, and a revival of interest in our customers. We need everyone behind that program adding imagination and originality."

This year will indeed be stimulating, but strenuous.

PORTER

Lubricated

PLUG VALVES



A brand new fluid control unit incorporating unique design features

- **DOUBLE-SEALED STEM**—gives twice the protection against leakage.
- **METAL-SHIELDED PACKING**—Non-rotating metal parts completely enclose stuffing box packing, insuring many times longer packing life.
- **PROTECTED LUBE GROOVES**—Vertical grooves are 180 degrees apart, hence are never exposed at ports.
- **PRESSURE GUN LUBRICATION**—Easily adapted to pressure gun lubrication by unscrewing the lube feed assembly and inserting a buttonhead fitting.

Porter Lubricated Plug Valves are sold by authorized distributors and by the following offices of the Hinderliter Tool Division:

Alice, Tex.	Great Bend, Kan.	Odessa, Tex.
Casper, Wyo.	Greggton, Tex.	Seminole, Okla.
Clay City, Ill.	Houston, Tex.	Tulsa, Okla.
Fort Worth, Tex.	New Iberia, La.	Wichita Falls, Tex.

H. K. PORTER COMPANY, Inc.

PITTSBURGH 22, PENNSYLVANIA

District Offices in Principal Cities

GUY CORFIELD

TECHNICAL TRENDS

Air Pollution Symposium

A TWO DAY NATIONAL AIR POLLUTION SYMPOSIUM was recently held at Pasadena, Calif., under the sponsorship of Stanford Research Institute in cooperation with California Institute of Technology, University of California and University of Southern California, and contributed to by an imposing and nationally renowned group of scientists, engineers, medical specialists and horticulturists. This subject should be of considerable interest to the gas industry, beyond incidental plant problems, because air pollution is chiefly attributed to and evidenced by smoke from chimneys and fumes from heat processing which the public associates with fuels in general. Accordingly, the industry should be alert to the thinking and developments in air pollution control, and be prepared to explain the completeness of combustion and cleanliness of gaseous fuels; and, since sulfur is a constituent which also holds public interest, to stress the relatively negligible amount of sulfur dioxide that is produced by gas per unit of heat release. (It can be calculated, for instance, that fuel oil with 1% sulfur contains 540 lb of sulfur per billion Btu of heat content, whereas natural gas with one grain of sulfur per 100 Scf contains 1.3 lb of sulfur per billion Btu of heat content, *a ratio of 415 to 1.*).

The complete proceedings of this symposium will shortly be available and can be obtained from the Los Angeles offices of Stanford Research Institute at 612 So. Flower street, Los Angeles 14. Excerpts from the abstracts of some of the delivered papers are as follows:

Industry will continue to expand and it is essential that it do so. It is by no means the only source of air pollution, but it is in industrial centers that the most difficult problems are encountered. Many industries are controlling dusts, fumes, odors and smoke by change in processes, collection at the source, or by adjustment to weather conditions. Thorough investigation of the means available is essential, however, to avoid excessive cost or outright failure. Generally, there is inadequate knowledge to guide the development of standards, and objectives are confused to some extent by lack of physiological information and by insufficient understanding of the chemical and physical behavior of contaminants in the atmosphere itself. This situation may result in unduly lax regulations that are ineffective, or in codes that are incapable of enforcement. At its worst, this complex technical problem may be used to serve obscure and unrelated political ends.

An important part of the impurities polluting the air in industrial areas consists of suspended particles. The equipment now manufactured for removing such dust and fumes from gases before they are discharged into the air may be classified under five headings: (1) baghouses and filters, (2) washers and scrubbers, (3) centrifugal collectors, (4) electrical precipitators, and (5) ultrasonic agglomerators. It is the modern tendency to combine several methods in one installation.

The earth's atmosphere is not an infinite sink into which man may pour an unlimited quantity of pollutant. With a given array of sources and effluent rates, the pollutant that may be disposed of into the atmosphere depends on the weather and on the amount of pollution that is tolerable or otherwise permitted, not merely in the immediate vicinity of the source but sometimes for distances of many miles.

Time has arrived when the economics of implementing air pollution control measures must be measured. While the attainment of so-called "pure" or "clean" air in and around our cities is a worthy objective, American industries and municipalities can never afford the economic cost involved in achieving the ultimate objective.

The pollution of the atmosphere with air-borne industrial wastes and with the products of combustion of industrial, household and transport fuels is capable of causing respiratory irritation and distress on the part of large proportions of the resident population and fatalities among the older segment of the population with special reference to those afflicted with cardio-respiratory impairment. These effects have been acute in their onset and duration and have disappeared largely or entirely when the atmospheric condition has been relieved. The evidence indicates that persistent or chronic types of respiratory disease resulting from pollution of the atmosphere have been confined thus far, with the rarest exceptions, to conditions associated with hazardous occupations, and with air-borne materials derived from other human beings and animals (infections) and from growing vegetation (pollens, etc.).

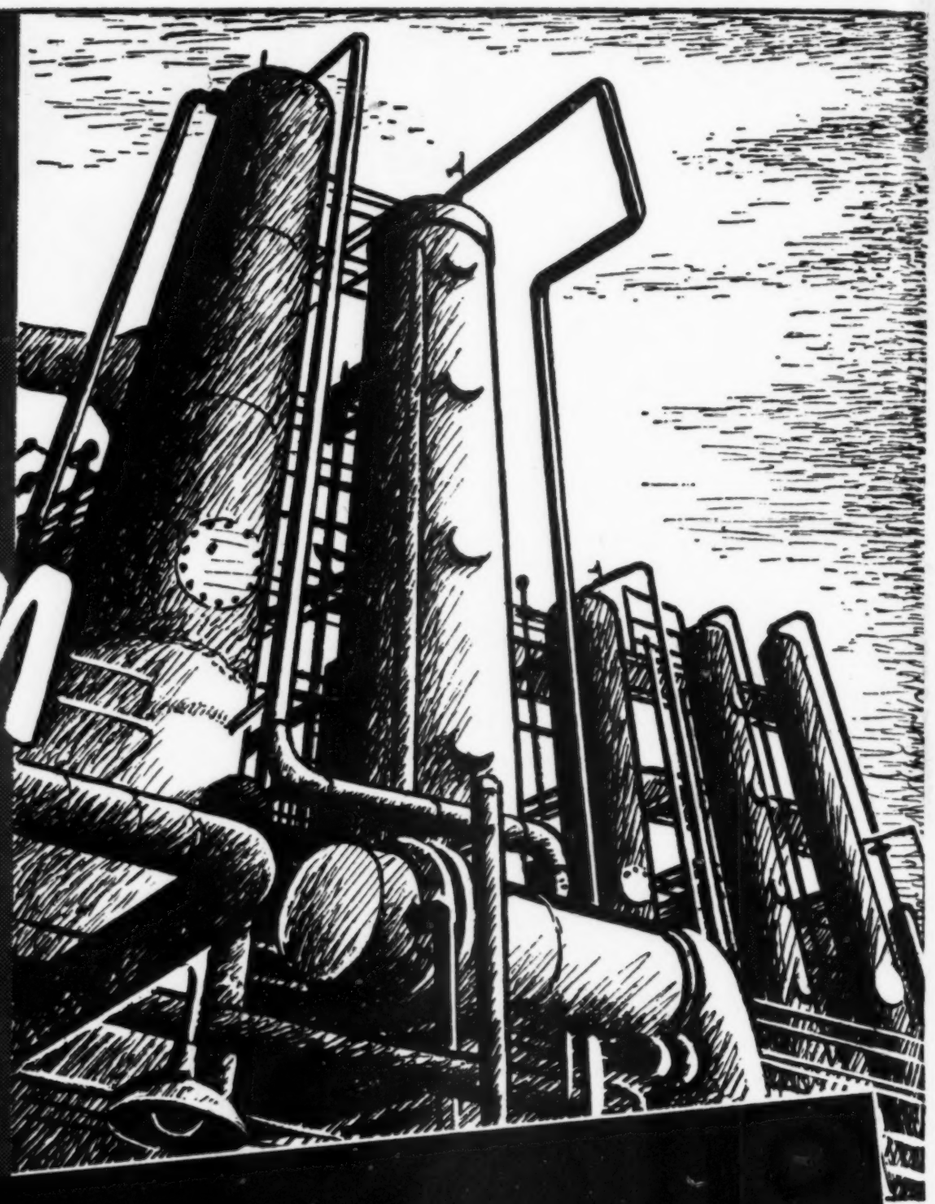
The most important chemical contaminants to which the general public may be exposed are irritant elements or gases such as sulfur and its oxides, and the halogens and the halogen acids. There is little reason to believe that new and mysterious diseases are being spread by chemical contaminants of the general atmosphere, nor that even chronic exposure to the degree of contamination which exists in the worst areas is, alone, producing new disease.

The range of concentrations of sulfur dioxide which could (through a series of controlled tests) be tolerated indefinitely by sensitive species of plants such as alfalfa and buckwheat was 0.1 to 0.2 ppm. Both of these species were spotted in 7 hours at 0.4 ppm. Chlorine had a similar effect. The critical concentration of hydrofluoric acid gas was around 0.1 ppm. Ammonia gas injured all leaf tissues at approximately 10 ppm. for a period of 7 hours. Carbon monoxide caused injury at 1 part of the gas to 2000 parts of air, and ethylene at 1 part per 10 million parts of air.

A somewhat similar symposium, on Atmospheric Contamination and Purification, was held earlier this year in connection with the American Chemical Society meeting in San Francisco, and the papers are reproduced in the December 1949 issue of *Industrial and Engineering Chemistry*.

PENTALARM YOUR PIPELINES . . . RECORD IT WITH THE COLORIMETER!

Negligible Fractionation with



PENTALARM

THE WARNING ODOR FOR FUEL GASES

Pentalarm's narrow boiling range results in uniform odorization because:

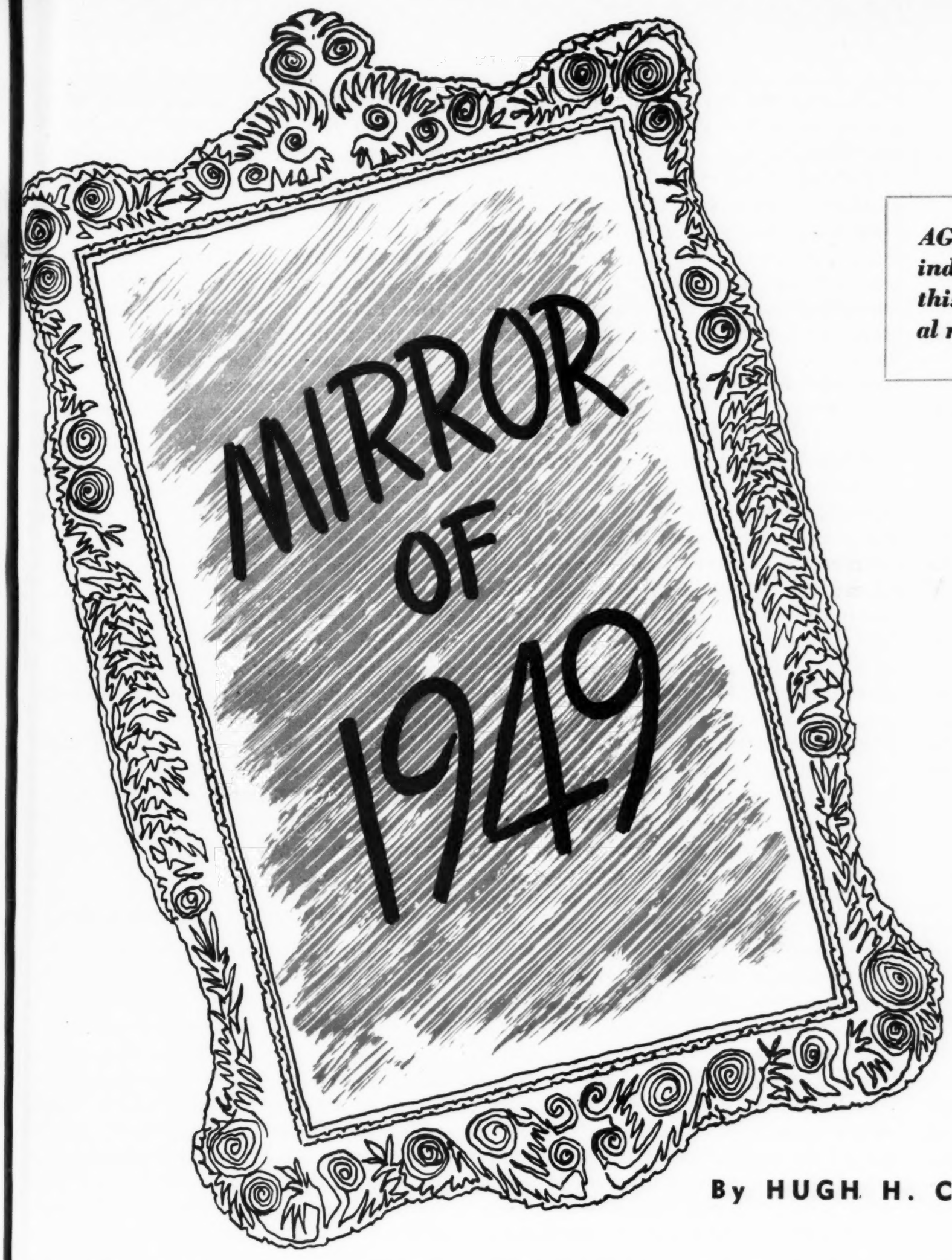
Narrow boiling range causes uniform evaporation and even pickup by gas in the system.

For samples and technical information write to Dept. F.

SHARPLES TRADE MARK CHEMICALS

SHARPLES CHEMICALS INC.

NEW YORK
PHILADELPHIA
CHICAGO



AGA's new president discusses gas industry progress during 1949 in this abridged version of his annual report to association members.

By HUGH H. CUTHRELL

THE year 1949 saw the gas industry well on its way to becoming one of the nation's romance industries. The glamor and color inherent in the spectacular growth of the country's natural gas system contributed much to this changing picture. The installation of new gas making processes and other research developments plus noteworthy expansions of production and distribution facilities by manufactured and mixed gas companies also helped the gas industry reach new heights in 1949.

Tremendous extensions of our natural gas transmission lines are scheduled to bring natural gas into new areas in 1950. The maunfactured gas companies have construction programs planned that will further increase production and distribution capacities.

Many new records were established by the gas industry in 1949. More than half a million new customers were added to the gas utility lines. Sales of gas to ultimate consumers reached a new high level. Revenues from the sale of gas were the highest on record. Capital expenditures for construction and plant expansion totaled nearly $1 billion, breaking all previous records. Promotion, advertising and research activities carried on by the American Gas Assn. under the PAR plan gained in volume and effectiveness during the year. Coordinated promotional and advertising campaigns carried on by the association, the Gas Appliance Manufacturers Assn., gas utility companies, gas appliance manufacturers and dealers lifted the sales of gas appliances and equipment far above prewar levels.

Natural gas transmission lines now are under construction that will bring natural gas to metropolitan New York and New Jersey in 1950. It is almost certain that the New England states and the South Atlantic territory soon can augment their manufactured gas supply with natural gas. Promotional and advertising campaigns now planned for 1950 hold promise of sales of gas appliances this year passing even the peak records in 1948.

At the end of 1949 the gas utilities were serving an estimated 23,763,400 customers, including about 334,000 LP-Gas customers served directly by utilities. This was an increase of 2.5% over the 23,183,000 actual customers served in 1948. Of the total number served, 13,319,000 were receiving natural gas, a gain of 8%; 8,566,600 were receiving manufactured gas, a decline of 0.4%; and 1,544,300 were served with mixed gas, a decrease of 20.1%. (The decline in manufactured and mixed gas customers can be attributed to changeovers.)

In addition to the customers reported above it is estimated that more than 5.5 million customers are being served with LP-Gas in territories not reached by gas utility mains.

Utility sales of natural gas during 1949 were about 3,153,335,000,000 cu ft, an increase of 8.9% over 2,894,-

650,000,000 cu ft sold in 1948. Manufactured gas sales amounted to 420,087,000,000 cu ft, a decline of 5%, while mixed gas sales decreased 8.5% to total 135,577,000,000 cu ft.

Total revenues from the sale of gas reached an all-time high of $1,694,331,000, an increase of 7.3% over revenues of $1,579,603,000 in 1948. The major increase occurred in the natural gas branch where revenues rose to $1,097,328,000, 10.3% over 1948. Manufactured gas revenues were $484,305,000, a rise of 4.6%, while mixed gas revenues, most affected by changeovers, declined 10.6% to total $91,958,000.

New Facilities

The gas industry continued its tremendous efforts to meet the ever-increasing demand for gas last year. Expenditures for gross construction of new facilities and expansion of present facilities in 1949 reached an all-time high of $943 million, exceeding last year's peak of $770 million. The industry recently resurveyed its capital requirements for the five-year period from 1948 through 1952 and found that about $3.5 billion will be required. It is estimated that $1.8 billion will be spent by gas companies in the next three years. Manufactured and mixed gas companies expect to spend $500 million during the five-year period, with natural gas utilities spending $3 billion. Of this amount about $1.8 billion will go for new natural gas transmission facilities.

Expansion was again the keynote of the natural gas industry during 1949, continuing the spectacular growth begun at the end of the war. (See "Pipeline Section.")

Proved reserves of natural gas climbed to new high levels. The association's committee on natural gas reserves estimated that proved recoverable reserves at the beginning of 1949 amounted to 173.8 trillion cu ft, an increase of 7.9 trillion cu ft over the previous year. Production of natural gas jumped from 5.6 trillion cu ft in 1948.

Manufactured Gas

While the demand for gas continued to exceed production capacity in a few manufactured gas areas, the majority of the companies ended the year with no restrictions. A survey recently conducted by the AGA bureau of statistics showed that more than $6.6 million families now use gas for space heating and house heating and that it was expected that 693,000 new gas house heating customers would be added in the 1949-1950 heating season.

Catalytic cracking processes and high Btu oil gas processes discovered under the industry's research program are being integrated into plans of manufactured gas companies for meeting peak load problems. The advent of natural gas will be a boon to some manufactured gas areas.

A new peak in the laboratories' services to the gas industry was established for the third successive year. Testing and inspection services, the major activities, exceeded those of the previous year by about 20%. Operations totaled nearly $1 million, approximately double that of the prewar peak of 1940. Additional personnel was employed, facilities were improved and added floor space purchased for the Pacific Coast branch was brought into full operation. The number of manufacturers obtaining approval for their products increased approximately 25% and personnel was expanded to provide adequate inspection services.

Research activities were continued at about the same pace as last year, with some $160,000 in domestic, industrial, commercial, and mixed gas projects financed through the PAR plan handled at the laboratories.

Development of sales plans and methods was an important task of the residential gas section during 1949. Long range planning was initiated in 1949, and the general promotion planning committee and the national advertising committee were presented with organized selling and merchandising programs for 1949 and 1950.

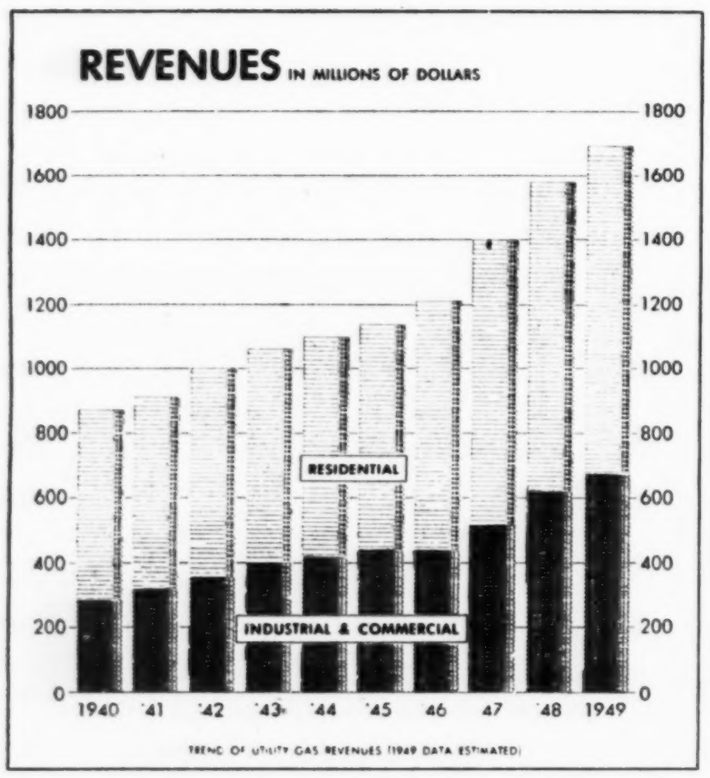
Home service departments of gas utility companies in the U. S. and Canada last year employed 1200 women in making nearly 9 million customer contacts. Home service calls were made on about 376,000 new customers and home service representatives gave more than 6500 demonstrations with about 350,000 attending company auditorium demonstrations and 590,000 in attendance at outside demonstrations.

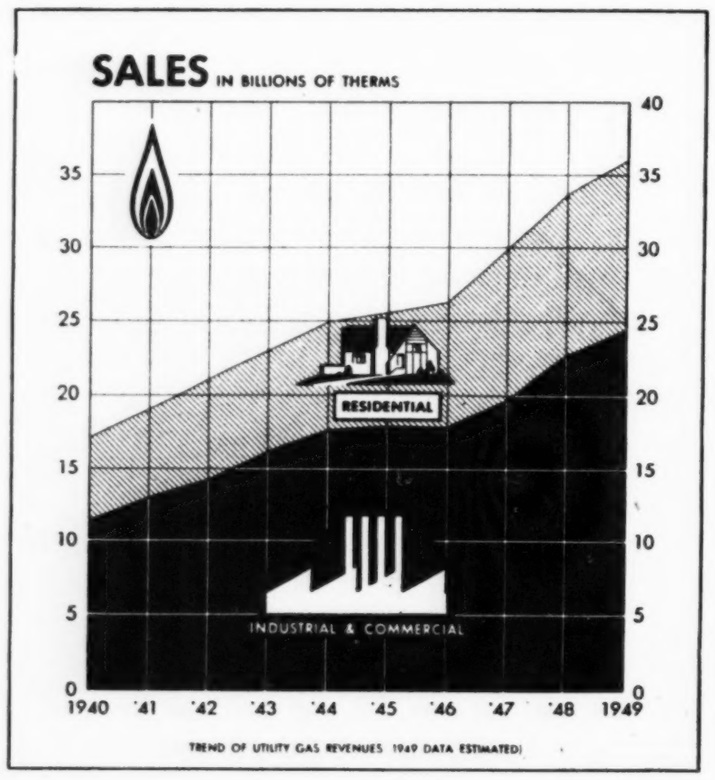
"New Freedom In Her Modern Gas Kitchen," a new moving picture produced by the McCall Corp. and AGA has received high praise. Many gas utility companies have purchased prints for their own use.

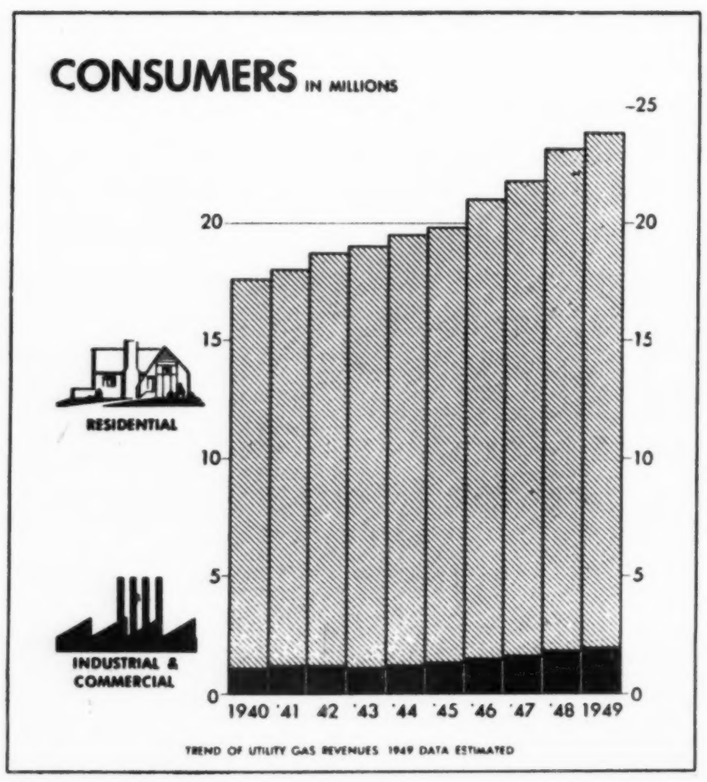
Industrial and Commercial

While the increase in revenues from sales of all gas for the year was 7.3% above 1948, industrial gas revenues were up 8.3% and commercial gas revenues rose 7.9% over 1948. The combined industrial and commercial revenues now account for 38% of the total revenues of the industry.

Many new developments were perfected during the year, among them being a new type of large-volume water heater built so the water supply is directly tied in with commercial dishwashers. In the industrial field a new application of carbo-nitriding in surface hardening of metals maintains carbon pressure and heat contained in a furnace over a week-end with no change in the properties of the metal being treated.







The association completed its fifth year of operation under its coordinated promotion, advertising and research plan on Sept. 30, 1949. Nearly $7.75 million, voluntarily contributed by member companies, has been devoted to the improvement of gas and gas services during the five-year period.

Research

More than 50 projects embracing research work in gas production and utilization, mixed and other gases, in domestic and general technical gas research fields were prosecuted under the association's coordinated research program last year.

The outstanding development of the year in advertising was the complete coordination of advertising themes by the association, appliance manufacturers, gas utility companies and dealers, resulting in substantially higher return on the dollar invested and a rising volume of appliance sales during the latter part of the year.

Newspapers were again at the head of the list carrying advertising totaling $3.2 million devoted to the promotion of automatic gas ranges, automatic gas water heaters and the gas refrigerator. Additional local campaigns were conducted in behalf of the all-year gas air conditioner, the gas incinerator and the automatic gas laundry dryer.

The largest single promotion was on the automatic gas range. The association spearheaded this drive with an appropriation of $550,000 for national consumer magazine advertising, and the manufacturers spent in excess of $1 million using the same theme as the association's advertising. A second campaign was initiated in behalf of automatic gas water heaters and a third drive promoted the gas refrigerator. Total magazine expenditures for all gas appliances, by the association and the manufacturers were $2 million.

Promotion

Domestic gas ranges were the chief promotional item featured in 1949. Early in the year about 200 gas utility companies coordinated in a drive utilizing a promotional portfolio produced by the promotion bureau. A survey of public attitudes toward water heating had been made earlier and the answers to many fundamental questions concerning customer preferences were set forth in a booklet for gas utilities. Points of superiority of the gas water heater were established and used in national advertising.

The association cooperated with Encyclopedia Britannica in the production of a moving picture film entitled "Gas In Home and Industry," for educational

GAMA PRESIDENT FORESEES SALES GAIN IN 1950

Sales of gas appliances should ride on the crest of sizeable increases over the totals for last year, according to results of a Gas Appliance Manufacturers Assn. survey, reported last month by Stanley H. Hobson, association president.

While sales of some gas appliances fell below the all-time record reached in 1948, in almost every classification, sales were considerably above prewar levels in 1949. Gas range shipments in 1949 totaled 2 million units, about 40% over prewar average. Sales of automatic gas water heaters were 1,350,000 units, three times as great as the prewar years. Increased supplies of gas helped gas heater manufacturers and shipments of gas warm air furnaces totaled 260,000 units, a gain of 35%; gas boilers, 37,000 units, up 30%; while gas floor furnace shipments were 200,000 units, an increase of about 30%. Manufacturers shipped 290,000 gas conversion burners during 1949, nearly 500% more than 1948. Gas heating equipment sales in 1949 considerably surpassed those of 1948 when gas heating restrictions were in effect pretty generally.

Peak sales figures amassed in 1947-48 may well be threatened by this year's activity, according to Mr. Hobson. He said the GAMA survey, conducted among the association's 550 manufacturer-members, points to boosts of from 20 to 30% in domestic gas range sales during the year and even greater increases in the shipments of incinerators, refrigerators, and clothes dryers.

More than 50% of the gasmen polled expected to add to their sales forces during 1950, and where no such additions were expected, increased sales effort was predicted.

Within the division of appliance manufacturing set for tabulation by GAMA, survey results and prospects for 1950 were:

Domestic gas ranges: 16 manufacturers reported, representing an estimated 731,550 units to be shipped this year. GAMA's weighted average increase predicted: 28%.

Automatic water heaters: 14 manufacturers reported, representing an estimated 329,500 units to be shipped in 1950. Weighted average increase predicted: 5%.

Gas central heating equipment (boilers, furnaces, conversion burners): 27 manufacturers reported, representing 130,956 units to be shipped. Weighted average increase in sales predicted: 31% (or about 770,000 units.)

Gas floor furnaces: 8 manufacturers reported, representing 83,450 units to be shipped in 1950. Weighted average increase predicted: 18% (or, sales indicated of 260,000 units.)

Gas direct heating equipment: 14 manufacturers reported, representing unit shipments estimated at 514,750 for 1950. Consensus opinion (weighted average) increase predicted: 20%.

Hotel & restaurant equipment: 12 manufacturers reported, representing an estimated 28,597 units to be shipped. Weighted average increase in sales predicted: 30%.

GAMA was careful to explain in releasing results of its survey that it was not a strict prediction of things to come, but rather a projection of probabilities based on proved thinking by leading representatives of appliance manufacturing. Late entries into the manufacturing field, who predicted increases in sales for their companies running as high as 500%, were eliminated from the survey tabulations, since their prognostications would have given an absurdly confident note to the results. Likewise, manufacturers of such specialized products as conversion burners (which are enjoying a tremendous boom in areas lately reached by natural gas) predicted sales rises that, in GAMA's opinion, would have given a distorted picture of the future for appliance manufacturing as a whole. These factors, and other specialized conditions, were taken into consideration at the time the survey (called "General Business Outlook for 1950") was completed, and the averages in each category listed were weighted correspondingly to make results truer, Mr. Hobson said.

ALL TYPES OF GAS

		1949 Estimate	1948 Actual	% Change
Customers:	Total	23,763,400	23,183,000	+ 2.5
	Residential	21,932,800	21,427,500	+ 2.4
	Commercial	1,711,900	1,639,200	+ 4.4
	Industrial	100,600	98,900	+ 1.7
	Other	18,100	17,400	+ 4.0
Revenues:	Total	$1,694,331,000	$1,579,603,000	+ 7.3
	Residential	1,021,663,000	958,026,000	+ 6.6
	Commercial	238,358,000	220,934,000	+ 7.9
	Industrial	408,794,000	377,415,000	+ 8.3
	Other	25,516,000	23,228,000	+ 9.9

NATURAL GAS

		1949 Estimate	1948 Actual	% Change
Customers:	Total	13,319,000	12,327,800	+ 8.0
	Residential	12,198,600	11,292,700	+ 8.0
	Commercial	1,060,000	978,700	+ 8.3
	Industrial	50,500	46,900	+ 7.7
	Other	9,900	9,500	+ 4.2
Sales (Mcf):	Total	3,153,335,000	2,894,650,000	+ 8.9
	Residential	905,823,000	832,205,000	+ 8.8
	Commercial	306,640,000	280,431,000	+ 9.3
	Industrial	1,821,503,000	1,668,437,000	+ 9.2
	Other	119,369,000	113,577,000	+ 5.1
Revenues:	Total	$1,097,328,000	$994,841,000	+10.3
	Residential	581,943,000	529,115,000	+10.0
	Commercial	146,382,000	131,556,000	+11.3
	Industrial	347,869,000	314,799,000	+10.5
	Other	21,134,000	19,371,000	+ 9.1

MANUFACTURED GAS

		1949 Estimate	1948 Actual	% Change
Customers:	Total	8,566,600	8,603,600	— 0.4
	Residential	7,975,400	8,019,700	— 0.6
	Commercial	544,100	537,600	+ 1.2
	Industrial	39,800	39,500	+ 0.8
	Other	7,300	6,800	+ 7.4
Sales (Mcf):	Total	420,087,000	442,154,000	— 5.0
	Residential	280,713,000	295,797,000	— 5.1
	Commercial	69,529,000	71,558,000	— 2.8
	Industrial	64,995,000	70,449,000	— 7.7
	Other	4,850,000	4,350,000	+11.5
Revenues:	Total	$484,305,000	$463,152,000	+ 4.6
	Residential	357,795,000	340,508,000	+ 5.1
	Commercial	75,095,000	71,175,000	+ 5.5
	Industrial	47,589,000	48,254,000	— 1.4
	Other	3,826,000	3,215,000	+19.0

MIXED GAS

		1949 Estimate	1948 Actual	% Change
Customers:	Total	1,544,300	1,933,500	—20.1
	Residential	1,453,700	1,823,900	—20.3
	Commercial	80,200	96,700	—17.1
	Industrial	9,600	11,900	—19.3
	Other	800	1,000	—20.0
Sales (Mcf):	Total	135,577,000	148,102,000	— 8.5
	Residential	81,994,000	92,216,000	—11.1
	Commercial	20,170,000	22,292,000	— 9.5
	Industrial	32,378,000	32,384,000	a
	Other	1,035,000	1,210,000	—14.5
Revenues:	Total	$91,958,000	$102,814,000	—10.6
	Residential	67,182,000	75,108,000	—10.6
	Commercial	11,764,000	13,489,000	—12.8
	Industrial	12,551,000	13,664,000	— 8.1
	Other	461,000	553,000	—16.6

a—Less than 0.05 percent decline.

use in schools. The association's Hollywood representative has been successful in placing gas appliances in more than 200 moving picture films.

A fall promotion campaign, "The Old Stove Round-Up," proved to be one of the most successful campaigns ever undertaken. It is estimated that more than 1 million gas ranges were sold as a result of this coordinated drive by gas utilities, appliance manufacturers, and dealers spearheaded by AGA. In October 1949, sales of gas ranges rose to 260,000 units, an all-time monthly record.

Statistical, Operating

A major continuing activity of the bureau of statistics was the publication of *Gas Facts*, the industry's statistical year book. The bureau resurveyed capital requirements of the gas industry and also completed a survey of gas house heating which presented an optimistic outlook for 1950. In cooperation with Edison Electric Institute, the association's committee on economics produced a study "Financing Utility Capital Requirements," highlighting the magnitude of the utilities' post war construction program and offering suggestions as to how individual utilities might facilitate financing programs.

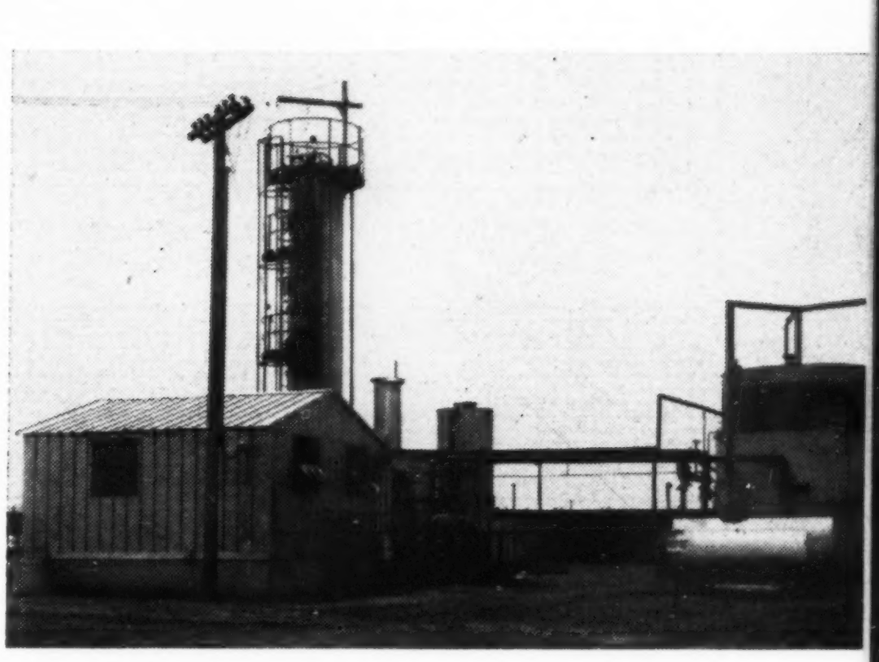
The association has voted to change the name of the "technical section" to the "operating section," which will continue to be responsible for the production and distribution of gas and its by-products. At two conferences during the year more than 1500 members participated in discussions of chemistry, motor vehicle, production and distribution advances and problems.

Accounting, Utilization

The accounting section cooperated with the statistical bureau and with the committee on economics of AGA in resurveying the construction program of the gas utility industry for the five year period 1948-1952.

Changes in types of fuel distributed by several utility companies have increased the calls for advisory services from the utilization bureau. Committees on comparisons of competitive services and domestic range tests performed excellent tasks in establishing data that will refute misleading claims of competitors.

New Plant Achieves Continuous Gas Generation



EXPERIMENTAL TUBE FURNACE for continuous gas generation and catalytic cracking, utilizing silicon carbide tubes (above, left). Buildings house controls, auxiliary equipment. AT RIGHT, view of the Cleveland plant, showing storage of feed stocks. Continuous gas generating unit shown in background.

EARLY last spring The Gas Machinery Co. erected on its own property in Cleveland an experimental gas plant, designed for continuous generation of gases utilizing various hydrocarbon feeds, such as natural gas, propane, gasoline, and light gas oil.

Construction of the plant was preceded by several years of theoretical study and by experimentation and research, particularly with reference to the application of silicon carbide tubes. The plant was constructed not only for development work but also for demonstration to the gas industry and for the development of special processes in which various members of the gas industry were specifically interested, such as producing certain gases and testing their burning characteristics.

A part of the extensive study and work which preceded this successful project included field test work on silicon carbide tubes in the company's industrial furnaces. Tests have already proved that certain process conditions are now worked out to be commercially applicable.

The first planned demonstration took place Oct. 21-22 following the AGA convention in Chicago. A number of convention delegates stopped off to witness the demonstration in Cleveland. A similar demonstration was held on Nov. 18-19.

The chief feature of the new apparatus is a continuous gas generator employing silicon carbide tubes which may contain a catalyst. Although hydrocarbon feeds are used, the equipment differs radically from "cat crackers" installed in oil refineries. The latter are relatively low temperature processes designed for liquid products, such as gasoline.

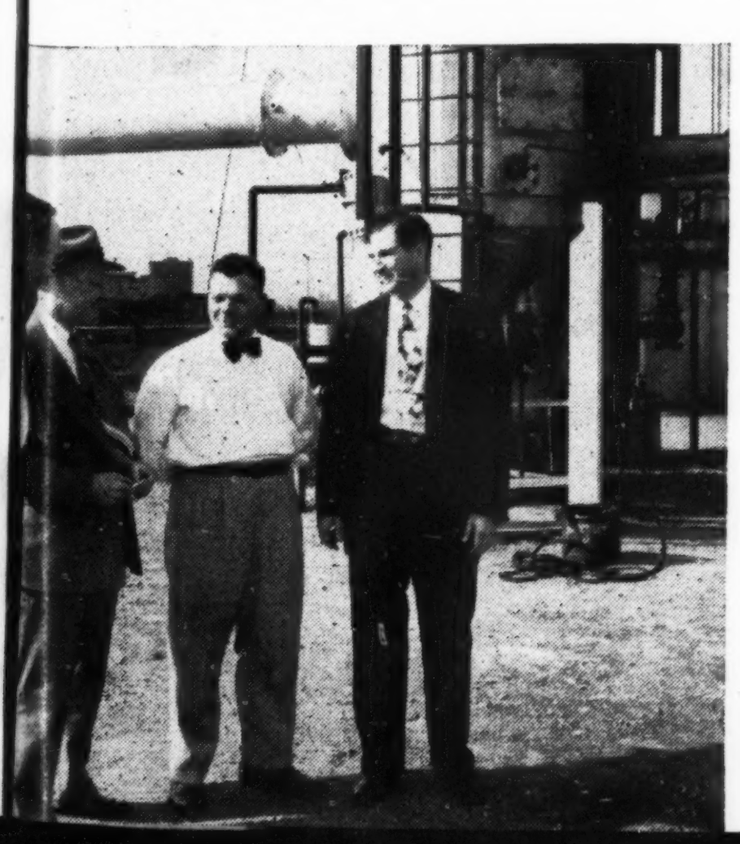
The Gas Machinery Co. apparatus is intended to produce light permanent gases for fuel gas or chemical synthesis. The reformed gas may be a so-called "carrier gas," which is then blended, usually with the same material as the process feed, to form a final mixed gas for distribution. One of the most important process feeds is natural gas, which has become available in increasing quantities. Another suitable process feed is propane or butane. Certain gasolines can also be used, such as a straight run gasoline or a natural (casinghead) gasoline.

Somewhat similar gases have been produced in the past by water gas manufacture, a cyclic process employing coke or other solid fuel. The reforming of hydrocarbons can be combined with the water gas process but coke is still required in the fuel bed and it remains a cyclic process. Of fairly recent date, tube furnaces have been installed for catalytic reforming using alloy steel tubes. However, the best available alloys have a maximum temperature limitation of 1850°F, whereas the Gasmaco development is suitable for operating temperatures from 1800° to 2700°F. At the higher temperatures, the chemical reactions involved are more rapid and more complete. The practical result of this is more production for less investment cost.

The heart of the new continuous gas process lies in the employment of silicon carbide tubes. The advantages of silicon carbide as a high temperature process material have been known for years. Some of the outstanding features include its heat storage and heat transfer qualities, particularly at high temperatures where its radiation coefficient is valuable.

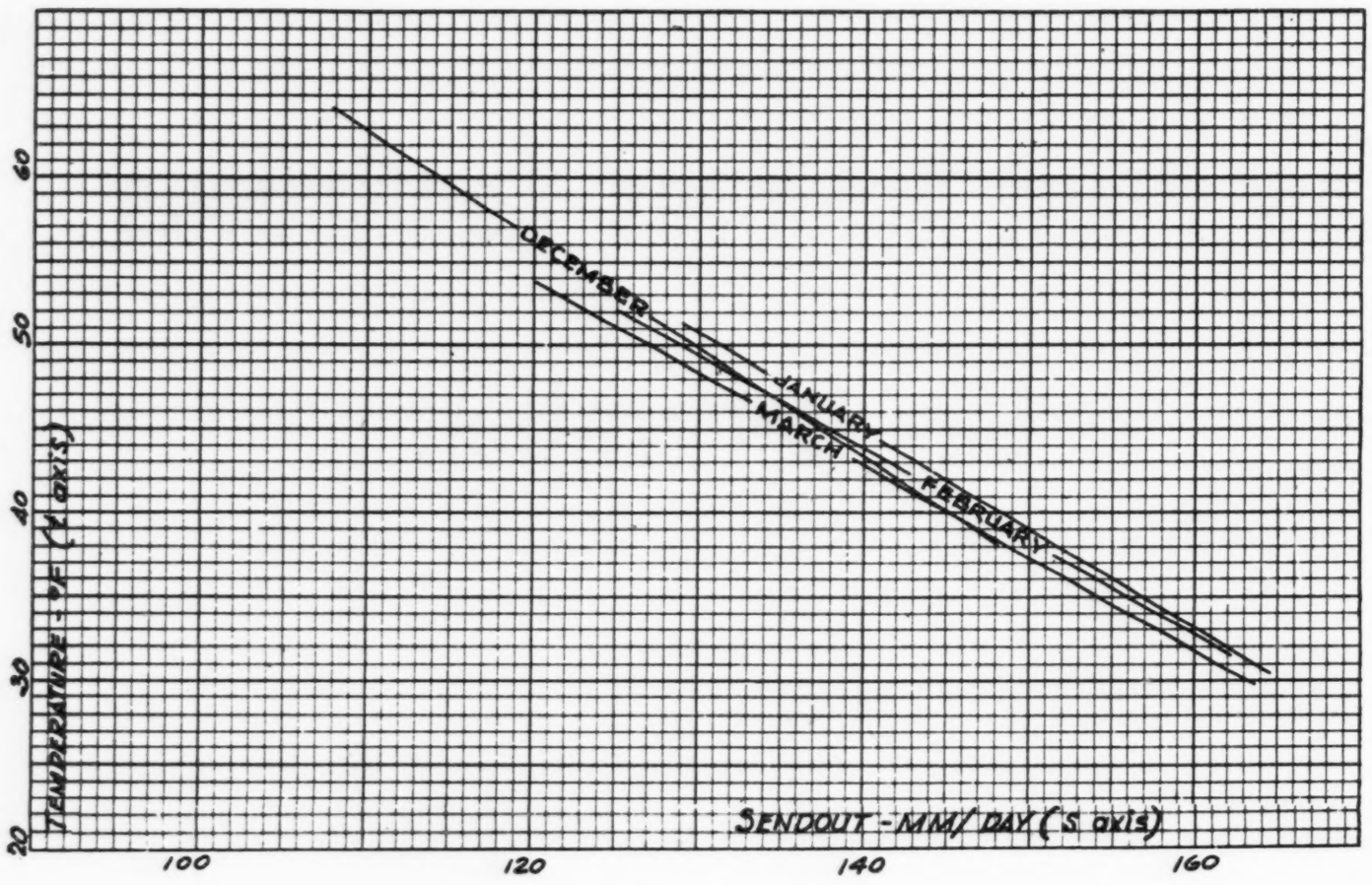
For a number of years silicon carbide has been in various refractory shapes, including tubes. It had not been possible, however, to manufacture the tubes in long lengths and no method of coupling had been developed. The Gas Machinery Co. was successful in its experimentation to arrive at a type of joint which proved gas tight and accommodated the stresses and deflection tending to result from expansion and contraction of the material. This patented silicon carbide tube-and-joint has been used successfully for several years in industrial heat treating furnaces which the company manufactures. It is the same type of construction which is now being employed in the continuous gas generator.

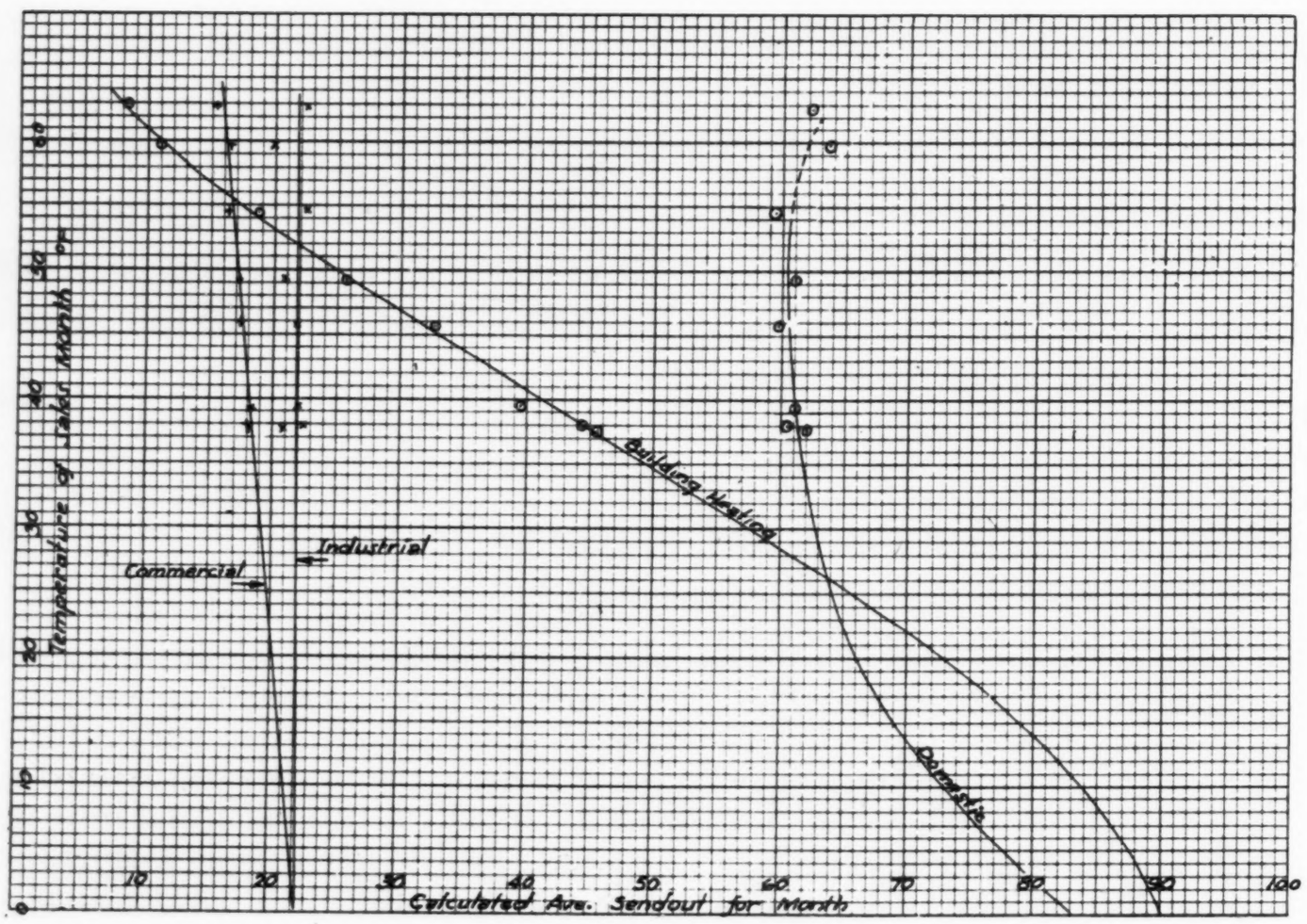
The generator is heated by combination oil and gas burners arranged in firing zones with automatic control. The gas generator and auxiliaries form a "package type plant" subject to "push button operation."

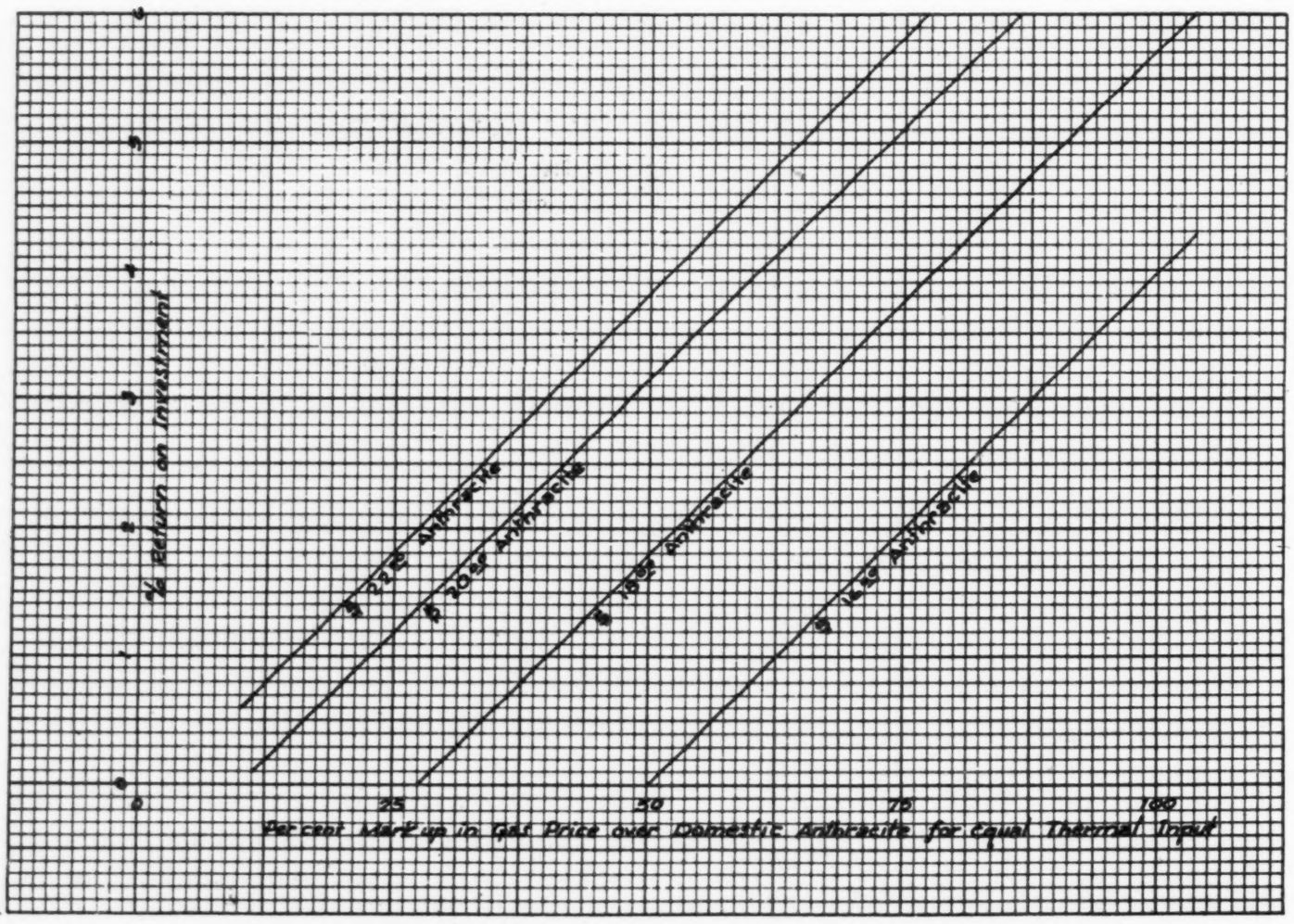


DEMONSTRATION of continuous generating equipment followed AGA convention. Left to right: H. M. Killmar, The Carborundum Co.; S. H. Horsfield, Long Island Lighting Co.; E. E. Witham, Long Island Lighting Co.; Robert Kyle, Gas Machinery Co.

How to Mak
By Long an







THE making of forecasts necessitates the establishment of bases from which to work. The purpose of this article is to explain the bases which we have found are an adequate foundation, for once the base is established, the development of a forecast is relatively simple.

The first, certainly the most obvious, and possibly the cornerstone of this foundation is the temperature-sendout curve. Probably most gasmen have plotted and used this curve. In our company, we made quite a study of the relationship back in the early '30's, and have used the techniques then developed ever since.

In order to eliminate the personal element in the plotting of curves, the method of least squares was tried, and found eminently satisfactory. The method of least squares determines a curve, which, according to the equation selected, mathematically represents all the points of a given set of data, giving to each pair of points equal weight. We investigated two curve forms, and finally concluded that a straight line equation was best adapted to the usually available data. The equation was of the form of $s = a + bt$ where "s" equals the sendout and "t" equals average or mean temperature for the day.

In the derivation of the constants "a" and "b" for this equation, it was found that, when a month is used as the calculation unit, Saturdays, Sundays and holidays should be excluded, although a group of a given day of the week, or any other grouping which we felt had some natural relation, could be made into an equation. The temperature used for many years was the daily mean for New York City, but in recent years the

Fig. 1. Temperature-sendout curves, winter 1948-49.

Fig. 2. Calculated class of business, temperature-sendout curves, winter 1948-49.

Fig. 3. Return on investment required for building heating sales with varying ratios of gas to coal price.

ak ans for System Operation
an hort Term Forecasting

By JOHN B. BONIFACE

J. B. Boniface, who originally presented this article at the AGA annual convention, held in Chicago Oct. 17-20, has been employed by Public Service Electric & Gas Co., Newark, for almost 24 years.

After graduation from Stevens institute in 1926, he joined the company as cadet engineer. Two years later, he was assigned to the office of the general superintendent of manufacturing in Newark; in 1939, he was appointed planning engineer in the company's gas department.

More recently, he has been identified with Public Service's program of obtaining natural gas from Transcontinental Gas Pipe Line Corp. and Texas Eastern Transmission Corp.

This article, treating an ever-present industry problem, may present a workable solution to utility companies faced with serious cold weather peakload worries.

8 a.m. to 8 a.m. average temperature corresponding to the sendout day, has been used with a slightly better correlation.

As has been the experience of other investigators, we have found that for individual days, temperature is not the only criterion affecting space heating load, for solar radiation, wind and perhaps the presence or absence of a cloud cap during the night all affect the heating load and hence the sendout. Fortunately, the use of a reasonably long period of time, such as a month, has caused these other variables to cancel out and the curves follow a consistent pattern.

Curves plotted for the various months of the winter of 1948-49 are shown in *Fig. 1*. A specimen calculation is included in the appendices.

By the installation of flow meters on certain major interconnecting mains, we have been able to subdivide our total sendout and get three curves, which are somewhat more useful than a single curve for the entire company.

In recent years, the character of our business has changed markedly because of the general acceptance of building heating with gas. Hence, we have attempted to analyze the component parts of temperature-sendout curves, and to construct temperature-sales curves for the various classes of business.

We found that the average sendout per day calculated from the sales reported for a given class of business could be plotted against the equivalent temperatures of the sales month, and, particularly for building heating, a very useful curve obtained. Unfortunately, the temperature for a sales month rarely went below 30° F, and as our design temperature is 0° F for a 24-hour average, extrapolation was neccessary. Both the domestic (i.e., cooking, refrigeration, water heating, and incidental space heating) and the building heating load are seriously affected by extremely low temperature, so that we were faced with analyzing and allocating the sendouts on the three 0° days which had been a part of our modern experience.

The temperature-sales curves for the four classes of business for a typical winter are shown in *Fig. 2*. The domestic sales curve bends away from the vertical temperature axis at both high and low temperatures. The curve for the lower temperatures has been developed from a study of our three 0° F days and such other cold days as have been available. We know that the slope of the lower section of the curve is steeper now than it used to be and that it can vary from year to year with availability and cost of other domestic fuels. The general acceptance and installation of thermostatic control of home heating plants has in our opinion accounted in part for the improvement in load factor which is associated with the steepening of the slope of the curve.

The curve for building heating is an interesting one. Most of the points lie on a straight line drawn through a zero consumption at 65° F. As we approach 65° F, the curve bends up, which is logical when we remember that there is always some pilot consumption, an average temperature of 65° for a meter reading month does indicate some heating load, and the efficiency of utilization drops off at very low heating loads. On the other end of the curve, we first as-

TABLE 1. CALCULATED VALUES OF CLASS OF BUSINESS SENDOUTS AND TEMPERATURES FOR WINTER 1948-1949

Month	Avg. Meter Reading Days	Temp. of Meter Reading Mo.	Leakage and Temp. Cont. (Unacct. for)	Domestic		Commercial		Industrial		Building Heating	
				Sales MM	Equiv. S.O. MM	Sales	Equiv. S.O.	Sales	Equiv. S.O.	Sales	Equiv. S.O.
October	30.5	62.9°F	3.6%	1833	62.3	453	15.4	661	22.5	249	8.5
November	31.2	54.4	3.3	1796	59.5	494	16.4	683	22.6	569	18.8
December	31.0	45.9	4.1	1781	59.8	519	17.4	651	21.9	975	32.7
January	30.9	37.6	4.0	1843	62.0	541	18.2	619	20.8	1357	45.7
February	29.8	38.0	3.5	1745	60.6	521	18.1	643	22.3	1271	44.1
March	30.4	39.3	3.2	1801	61.1	537	18.2	651	22.1	1167	39.6
April	30.2	49.3	2.5	1803	61.2	509	17.3	616	20.9	760	25.8
May	30.2	59.7	3.6	1861	63.8	489	16.8	579	19.9	319	10.9

NOTE: Leakage and temperature contraction are calculated in accordance with the method outlined in article entitled "Accounting for the Unaccounted For" published in the *American Gas Assn. Monthly*, May 1936. The temperature of the meter-reading month is determined by the same method, although a very close approximation may be obtained by averaging the previous month with the current month.

TABLE 2. LOAD FACTORS FOR DESIGN PURPOSES

Classes of Business	Ratio of Avg. Day to Max. Day	Conversion Factors to Calculate Maximum Hour from Maximum Day	
		Sun. or Christmas 12 to 1 p.m.	Weekday 7-8 a.m.
Domestic	.68	.110	.034
Building Heating	.268	.0374	.0505
Commercial	.785	.048	.097
Industrial	.69	.003	.083

sumed that the sendout would follow a straight line to 0°, and so used these curves for several years. However, when we tried to correlate this extrapolation with the other data, we could not find that we were getting sendouts to correspond. We subsequently decided that we would get a house heating curve more reasonable for design use if we extrapolated on a straight line to 10° F, assumed that that sendout was the 0° F sendout, and then drew a smooth curve, connecting the 0° F point with the known part of the curve between 30° and 65°.

We had several reasons for making this assumption. First, when we had had virtually no building heating, we recalled that at temperatures below 20° F we had always had marked increases in the sendout, indicating that although the home heating systems in our territory were theoretically designed for 0° F, practically, this was not so, and the actual design temperature was somewhat higher. Second, at peak output, the efficiency of gas heating equipment is at its maximum with the commonly installed "off" or "on" thermostatic control. Third, it was our observation that on extremely cold days, people tended to reduce the air changes and conserve heat wherever possible, so that theoretical heat losses were not obtained at extremely low temperatures. After using this theory for several years we had two zero days in the winter of 1942-43 and we found that our forecast of the sendout for a 0° F day was very close.

In order to verify the theory, we installed demand meters in two areas several years ago, but we have had no 0° F days since their installation, so we have been unable to get a direct confirmation. Meanwhile, we are using this curve form for all of our design work.

A word of explanation is perhaps in order as to how we separate the building heating use from the domestic use of our residential customers using gas for building heating. In the early years, it was our practice to install two meters when a residential customer installed building heating, so that we have a considerable background of information regarding the domestic use of residential building heating customers. We presently know the total consumption of residential consumption of customers using gas for building heating, and using previous experience for estimating the domestic consumption, the building heating consumption for residential customers is calculated and added to the building heating consumption of customers on the straight building heating rate.

There appears to be some correlation between temperature and commercial sales, and we use a sloping curve for this class, while for industrial, we can find no direct relationship. Frequently, we combine these two curves for convenience and simplification.

A summary of the data from which these curves were located is shown in *Table 1*. The curve forms, however, have been determined by the study of a great deal of data which could not be included in this paper.

For short-term forecasting, these curves are calculated each winter by grouping the sales reported for each of the districts into the six works areas and making up curve sheets similar to *Fig. 2*. Knowing the 0° F load, the capacity of the plants, and the capacity of the interconnections, the load is allocated to each plant within these limits, and new capacity planned as needed.

In planning ahead for more than five years a slightly different technique has been used. From the class of business curves developed or from such other data as we had, we have determined the annual daily load factor, (i.e., ratio of the average day to the maximum day for each class of business). Then, after forecasting the rate of growth for each class over a period of up to twenty years, the maximum day for the system is quickly calculated. A tabulation of the load factors which we have used, and we make no pretense that they are highly accurate or necessarily usable in the design of rates, is shown in *Table 2*. It should be remembered that the seasonal business cycle and the weekend shutdown affect the commercial and industrial load to a greater degree than temperature. Hence, load factors for these classes of business must recognize these other factors and cannot be directly derived from these curves.

The design of pumping mains requires the forecasting of the maximum hour as well as the maximum day. We

APPENDIX A. TYPICAL CALCULATION OF TEMPERATURE SENDOUT CURVE—MARCH 1949

DATE	n	Avg. Temp. t	Sendout s	ts	t^2
Tuesday	1	30	172	5160	900
Wednesday	2	32	161	5152	1024
Thursday	3	32	161	5152	1024
Friday	4	38	142	5396	1444
Saturday	5	52	111	5772	2704
Sunday	6	46	124	5704	2116
Monday	7	30	163	4890	900
Tuesday	8	40	147	5880	1600
Wednesday	9	48	128	6144	2304
Thursday	10	41	142	5822	1681
Friday	11	36	150	5400	1296
Saturday	12	33	149	4917	1089
Sunday	13	37	146	5402	1369
Monday	14	42	142	5964	1764
Tuesday	15	31	166	5146	961
Wednesday	16	32	160	5120	1024
Thursday	17	39	146	5694	1521
Friday	18	26	167	4342	676
Saturday	19	24	162	3888	576
Sunday	20	33	151	4983	1089
Monday	21	49	134	6566	2401
Tuesday	22	54	118	6372	2916
Wednesday	23	55	118	6490	3025
Thursday	24	47	127	5969	2209
Friday	25	47	124	5828	2209
Saturday	26	59	97	5723	3481
Sunday	27	68	95	6460	4624
Monday	28	58	121	7018	3364
Tuesday	29	57	117	6669	3249
Wednesday	30	57	115	6555	3249
Thursday	31	40	143	5720	1600
TOTAL	23	961	3264	132,449	42,341

(Totals exclude Saturdays, Sundays, and holidays)

APPENDIX B. TYPICAL CALCULATION OF TEMPERATURE SENDOUT CURVE—MARCH 1949 (excluding weekends)

$$\Sigma(s) = na + \Sigma(t)b$$

$$3264 = 23a + 961b$$

$$a + 41.7826b = 141.9130$$

$$\Sigma(ts) = \Sigma(t)\,a + \Sigma(t^2)b$$

$$132449 = 961a + 42341b$$

$$a + 44.0593b = 137.8241$$

$$-a - 41.7826b = 141.9130$$

$$0 - 2.2767b = -4.0889$$

$$-a - 41.7826b = -4.0889$$

$$b = -1.796$$

$$a = 137.82 + 1.796 \times 44.059 = 137.82 + 79.13 = 216.95$$

$$s = a + bt$$

$$s = 217.0 - 1.796t$$

t	30.0	40.0	50.0
s	163.1	145.2	127.2

NOTE: The method of least squares for determining the equation which most correctly plots a large number of pairs of points is explained in Mills "Statistical Methods" published by Henry Holt & Co.

again have attempted to determine the component parts of our maximum hour knowing the total and the character of a part of the load from test. For design purposes we are using the ratios of maximum hour to maximum day shown in the *Table 2*. More data is needed in this field for we feel that our ratios are inadequately backed by test work in our territory.

It should be noted that in our experience using the data, we believe the time of the maximum hour is changing from noon on the coldest Sunday or Christmas to 7 to 8 a.m. on the coldest weekday. This is particularly important in high gas building heating density neighborhoods, for these areas have different peak hours from the system as a whole, long before the system hourly peak changes.

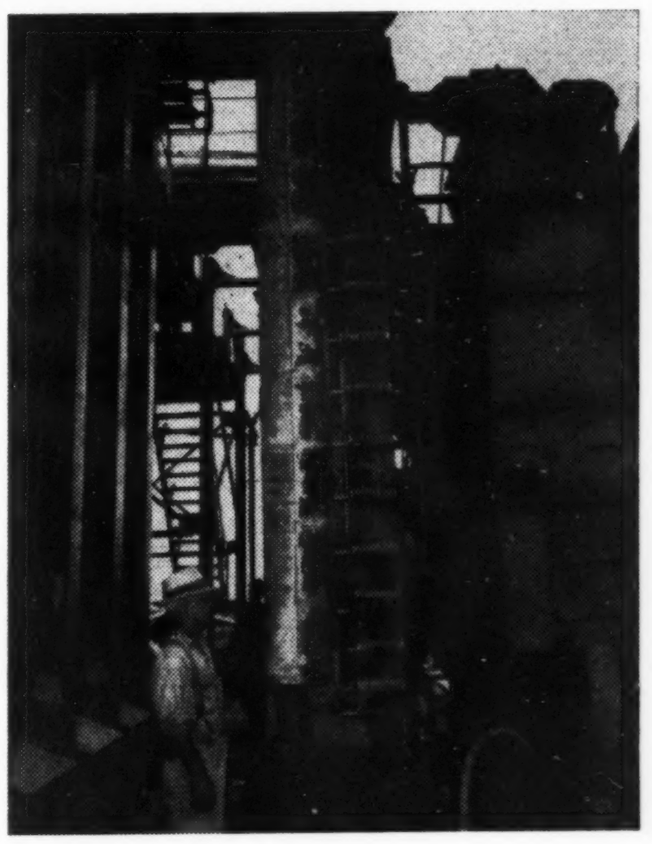
Many of us are faced with the making of long-term forecasts under difficult circumstances. The competitive fuel relationships have changed and our own pasts are not too good a guide for the future. When we use the saturation or sales per customer from the experience of other companies, for a long-term sales expectancy, we must allow for several factors which may make our sales expectancy unique.

The sales potential, particularly in building heating, is greatly affected by whether the territory is urban or suburban, static or growing. The aggressiveness of the competition of competitive fuels is a factor.

In trying to determine what our building heating saturation might become, we made a study for various prices of anthracite fuel, with the price of coke, bituminous fuel and oil appropriately related to this fuel, and with a fixed purchase price for natural gas, plotting the rate of return on our investment against various ratios of gas cost to coal cost to the ultimate customer. As was to be expected, the higher the coal price, the better the return on our investment. A sample of the type of curve which we developed is shown as *Fig. 3*.

Chicago 'Pushes' New Coke Ovens

VIEW OF THE TOP of the new coke ovens at Crawford station shows the improved Larry car in position to charge an oven with coal. At right are the half-round sheets of heavy asbestos shielding the standpipes which carry off raw gas from ovens to collecting main. Shields protect workmen in cleaning out valve openings.



SELF-SEALING oven doors, which seal off both ends of the oven during distillation, lock into place mechanically.

ON Aug. 2, in the presence of construction and operating employees, construction company officials, operating officials, and invited guests, the first oven in the new $5 million battery of coke ovens at Peoples Gas Light & Coke Co.'s Crawford station was "pushed," marking the completion of the construction job by the Koppers Co. and the beginning of operation by Peoples Gas employees.

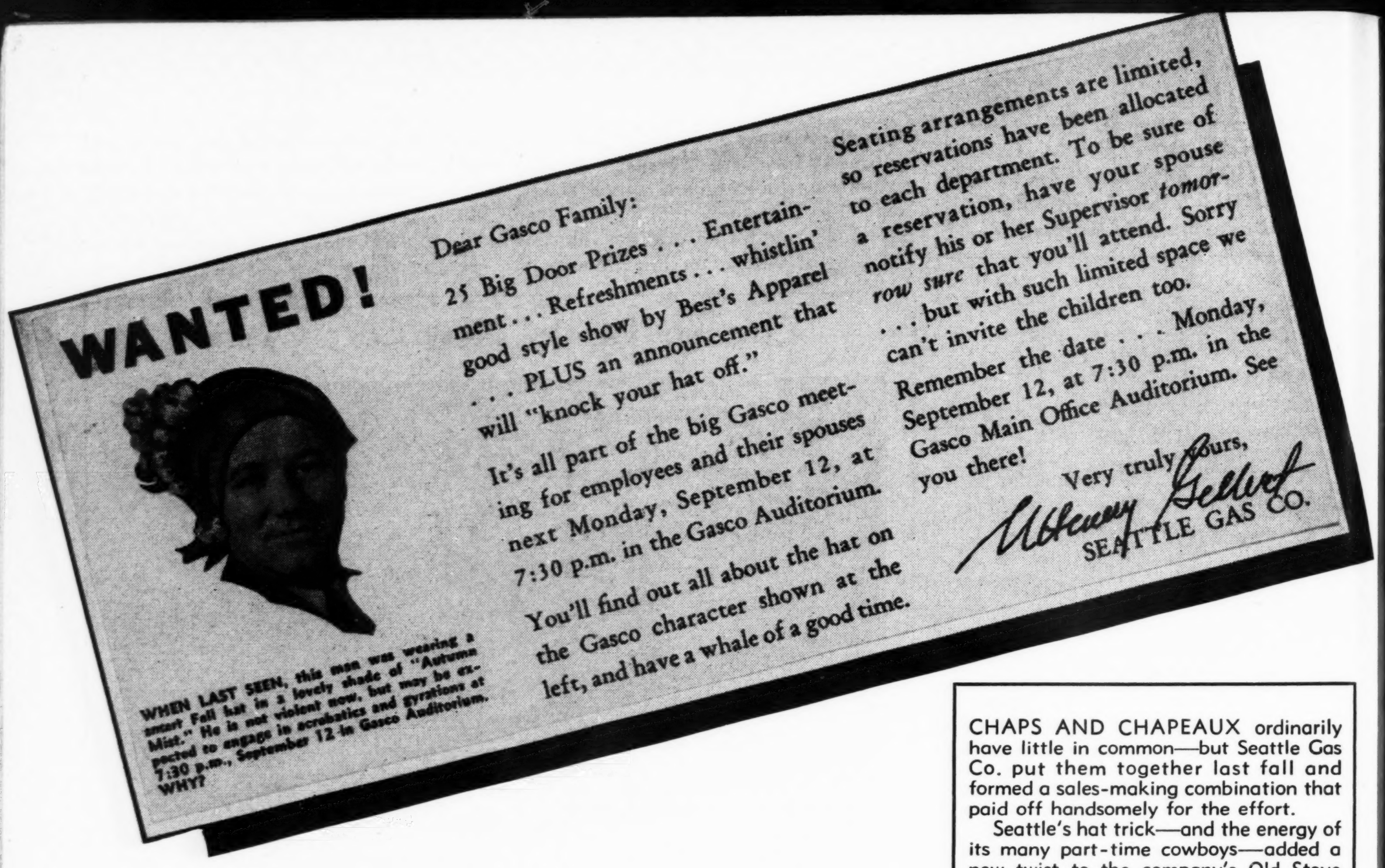
The basic operating fundamentals of the ovens remain the same as those applied to the old battery at Crawford, in continuous operation since 1921. However, the new battery embodies numerous improvements which combine to increase efficiency, raise the coke and gas output, and simplify various details of operation.

On the new battery there is an improved type of Larry car, which runs on a track on top of the ovens and carries the mixed coal from the bins to the ovens. It has a mechanism which makes possible a quicker charge of the coal into the oven, especially when the coal is wet.

The ovens are built in a manner that provides for the burning nozzles (gas jets for heating the ovens) to be cleaned and adjusted from underneath in a ventilated basement.

An improved mechanism for removing the oven doors, which seal the ends of the oven during the "coking" period, is made expressly for the new "self-sealing" doors. On the old ovens all doors are sealed with a heavy consistency of mud, to prevent escaping during the coking cycle.

The new quenching tower for the recently installed coke oven battery is an improvement over the old type, having a "stack" which returns more of the quenching water for re-use, and carries the clouds of steam off at a higher level.


WANTED!
Dear Gasco Family:
25 Big Door Prizes . . . Entertainment . . . Refreshments . . . whistlin' good style show by Best's Apparel . . . PLUS an announcement that will "knock your hat off."
It's all part of the big Gasco meeting for employees and their spouses next Monday, September 12, at 7:30 p.m. in the Gasco Auditorium.
You'll find out all about the hat on the Gasco character shown at the left, and have a whale of a good time.
Seating arrangements are limited, so reservations have been allocated to each department. To be sure of a reservation, have your spouse notify his or her Supervisor tomorrow sure that you'll attend. Sorry . . . but with such limited space we can't invite the children too.
Remember the date . . . Monday, September 12, at 7:30 p.m. in the Gasco Main Office Auditorium. See you there!
Very truly yours,
SEATTLE GAS CO.
WHEN LAST SEEN, this man was wearing a smart Fall hat in a lovely shade of "Autumn Mist." He is not violent now, but may be expected to engage in acrobatics and gyrations at 7:30 p.m., September 12 in Gasco Auditorium. WHY?

CHAPS AND CHAPEAUX ordinarily have little in common—but Seattle Gas Co. put them together last fall and formed a sales-making combination that paid off handsomely for the effort.

Seattle's hat trick—and the energy of its many part-time cowboys—added a new twist to the company's Old Stove (Range) Round-Up, and may point the way for other companies in their future round-up campaigns.

The unusual approach of the Washington utility, conceived and directed by Norbert O. "Nubs" Fratt, vice president in charge of sales, proved again how an integrated, creative promotional effort can succeed.

Fratt's Hat Tricks Spark Seattle Round-up

RUSKIN said, "He is most original who can adapt from the greatest number of sources."

In Seattle Gas Co.'s Old Range Round-Up, which ran from last Sept. 12 to Oct. 31, not only did we adapt from as many sources as possible but we think added a few new wrinkles of our own. For several reasons, the company had run no aggressive advertising nor staged any campaigns since before the war. It was, therefore, necessary to build from the bottom up, so to speak.

The general employee can be a very important factor in any sales campaign. Realizing this and also that no concerted effort had been made to gain his active support since prewar years, the management decided to carry on a pre-campaign employee sale during the month of August.

The purposes were threefold: first, to get as many employees as possible to own the very latest appliances; second, to generate their enthusiasm over the modern services we offer (and tell their neighbors); and third, to make all employees merchandise-minded in preparation for the Round-Up sale.

The range and water heater suppliers agreed to give special discounts up to 10% on their regular wholesale lists during the campaign for employee purchases. The company has always sold appliances to employees at cost for their own use. As this extra discount was also passed along, it enabled the employee to buy for his own personal use at less than the company's regular cost. A letter from the president announcing the sale was sent to each employee at his home. Notices of the sale were posted on all bulletin boards. Appliance displays were installed in the plant, shop, and accounting office. Each piece of equipment was tagged with the retail price and employees' cost. These displays were manned by salesmen at certain hours to explain the appliances to interested employees. Results were considered quite satisfactory — 5% of the employees actually purchased appliances and several bought more than one type.

A campaign of the stature of the Old Range Round-Up required planning of inventories. So that all local suppliers and distributors of gas ranges might be prepared, a special luncheon was held Aug. 5, five weeks before campaign time. Fourteen distributors representing 10 manufacturers were present. All in attendance enthusiastically promised to enlist the support of their dealers for the Round-Up.

Mr. Fratt is vice president in charge of sales, Seattle Gas Co.

By Norbert O. Fratt

Two weeks before the campaign a letter was sent to all gas appliance dealers inviting them to join the Round-Up. Enclosed were copies of the rules of participation and the AGA portfolio on tie-in material. These were followed up closely by personal contact that same week in order to obtain maximum coverage and whet appetites for the dealer meetings to follow.

For Dealers, Orientation

Each evening during the week preceding the Round-Up the home service auditorium was a whirlpool of activity. On successive nights distributors brought their various dealers in for dinner, a refresher course in gas range selling, and a presentation of the Round-Up program. The usual program was to give a complete range-selling presentation followed by dinner. The dinner consisted of vegetables, which had been cooking while the range sales presentation was going on, plus individual steaks which were served to the salesmen uncooked.Each then broiled his own steak to suit his taste. While this was going on he was given a sales story on the superiority of gas cooking—why gas broiling was smokeless, for example—while all the things talked about were going on right before him and he was actively participating.

The company felt that it had a unique and exciting customer inducement to "buy now" to offer as the cornerstone of this campaign. Through a promotional tie-in with Best's Apparel (an outstanding local women's apparel store), a beautiful lady's hat of the customer's own choice, of value up to $20, was given with the purchase of any modern domestic gas range at retail during the campaign. The gift of the hat was in addition to the liberal trade-in allowance that was made.

Those dealers meeting the cooperating dealer requirements were supplied the ladies' hats through Best's Apparel at a total cost per hat of $5. This charge was billed by the gas company, with the balance of the hat cost being paid by Seattle Gas Co.

Cooperating dealers were supplied books of hat certificates in the form of checks, which, when properly filled in and authorized, were given each qualified range purchaser, for presentation to Best's Apparel in exchange for a hat of her choice up to the $20 limit.

Paper popguns and other promotional material to be given away by their sales personnel, as well as buttons featuring the Old Range Round-Up slogan to be worn by salesmen, were supplied to dealers upon request.

Chuck Wagon Meeting

Although gas company salesmen had attended the dealer meetings during the week, a special presentation to them was necessary to instruct them in the use of the tools and gimmicks, and to inspire them to do the job ahead. The Friday morning before the campaign opened a breakfast meeting was held in the Mercer St. sales office. Two griddle ranges were hooked up upstairs. Members of the sales supervisory staff were in full cowboy regalia. As each salesman came up the stairs he was greeted with the report from the firing of a .38 caliber blank, a cowboy hat, bandana and a Round-Up button were plastered on him, and he was listed as a "Bit Dust Indian."

Following breakfast, a formal meeting was held to review the campaign.

The final morale and enthusiasm builder was the annoucement of the "president's prize contest" for company salesmen for range sales.

MISS ROUND-UP greeted employees at their meeting, supplied them with promotion literature.

FORE! Foreman Fratt and two Round-Up wranglers break through banner to kick off program.

Running Box Score

In order that the president might be kept promptly informed of results a large chart, mounted on a curtain roller, was prepared for his office wall. This chart listed each salesman's name, his weekly quota of range sales, weekly sales department totals, and grand total. Space was left to fill in actual results alongside of the quota figures. These figures were filled in each Monday morning showing the resuts of the previous week. A duplicate of this chart was placed on the blackboard in the sales office for the salesmen.

A general employee meeting was held on kick-off day, Sept. 12. A teaser notice was sent out to the wives of employees Sept. 2, promising door prizes, entertainment and a whistlin' good style show. At the same time each supervisor and foreman received a notice of the meeting with a registration sheet upon which members of his group could sign up for reservations. The response was almost instantaneous and by the next evening the reservation list was full.

At the meeting, in addition to the style show and entertainment promised, President N. Henry Gellert gave an inspirational talk to the employees on the importance of sales. The curtains were then opened revealing a full sized 24-

BONNET-BUSTER Fratt awards door-prize chapeau to samewhat reluctant winner.

sheet billboard. A moment later the sales manager and two assistants in full cowboy regalia came crashing through the billboard, shooting guns, whereupon the whole sales department jumped up and started to whoop and holler. Instead of a ten-gallon hat, the sales manager wore a chic new veiled turban from Best's Apparel. When quiet was at last restored he presented the Round-Up campaign to the employees and explained the new prospect plan for employees' families. Everyone in attendance felt he had had a good time and went away enthusiastic about the program and determined to help it succeed.

A well-rounded advertising campaign had been laid out. It was designed to give maximum coverage at a minimum cost. All regular media were used, including newspaper, radio, poster board, streetcar and truck cards, and direct mail. For emphasis and to create excitement, a big leadoff ad was run in two colors in both metropolitan papers. Front page ads in two colors were also used to support these ads and assure good overall coverage. The rest of the schedule was spaced to keep the campaign before the public. Particular emphasis in later ads was given to the "Hurry, Hurry, Hurry — Campaign Ends Soon" theme.

Radio space was bought on a participating basis on an established women's program over the local NBC affiliate. This assured good coverage at a minimum cost.

Poster board locations were secured on the main traffic arteries. These were all hand-picked locations that afforded good coverage at a fraction of the cost of a full showing.

Card frames were purchased for the sides of our trucks and service cars, and weather-treated car cards were inserted in them.

In order to get the value of repetition and at the same time save on production costs, we used the same layout and copy on the billboard, streetcar card, and truck sign. These streetcar cards also were used for floor and window decoration both by the company and the dealers.

El Rancho Gasco

The sales floor and display windows were decorated in the Round-Up theme. A corral 7 ft square was placed in the middle of the sales floor and an old gas and an old electric range placed in it. An appropriate bucking cowboy cut-out, with lariat ropes around the old ranges, carried out the Round-Up motif. A full sized billboard was mounted on the wall of the office over the customer service desks. All salesmen were dressed in cowboy hats and bandanas. Banners, posters, and balloons completed the excitement atmosphere.

Direct mail circulars featuring the Round-Up offer were mailed out to all domestic customers. This mailing was followed up by trained girls on the telephone to get the maximum benefit from the mailing.

A postage meter slug featuring the Round-Up was inserted in our mailing machine. This insured that all bills and other mail carried a reminder of the campaign.

A full sized cut-out of a covered wagon was placed on the marquee of the main office. "Old Range Round-Up" appeared boldly on its side while a direction post carried the highlights of our special offer. At night this sign was brilliantly illuminated.

Barrage Balloons

Almost every conceivable tool was supplied the salesmen and others in public contact. These were planned to build goodwill, strengthen public relations, and lead towards the closing of sales. Balloons, lollypops, and popguns were offered to children who visited our sales floor with their parents. The salesmen also kept a supply of these gimmicks in their pockets to give out during home calls. Twofold purpose: to build goodwill and to keep the kid quiet so the salesman could tell his story uninterrupted.

On original prospect calls the salesman was supplied a refrigeration dish cover to present to the housewife. He was instructed to thank the prospect first, for inviting him out to see her, and then to present the dish cover in appreciation. Did they get invited in? You bet they did!

Cookbooks were offered over the radio to prospects who came in to our sales office. Even square dance directions were given away — with our Round-Up copy on the back.

The real clincher in the deal was a checkbook drawn on Best's Apparel directing the store to deliver to the order of Mrs. Prospect one hat up to the value of $20. The salesman was instructed to make out his range order and to pass it to the prospect to sign. While she was hesitating, he pulled out the checkbook and started to fill in the prospect's name on the check and sign it. After the prospect had examined the check and signed the order the salesman then picked up both the order and the check, explaining that the sales manager's signature was necessary to make the check valid and that he would deliver it to her countersigned the day the range was installed. This worked well and prevented checks from getting out on delayed or cancelled orders.

When the salesman delivered the hat certificate he had a beautiful "Blue Flame" tumbler in his hand. He explained to the housewife that he would give her a set of eight of these glasses if she gave him the name and address of a friend or neighbor to whom she thought he could sell a range.

Want In the Act?

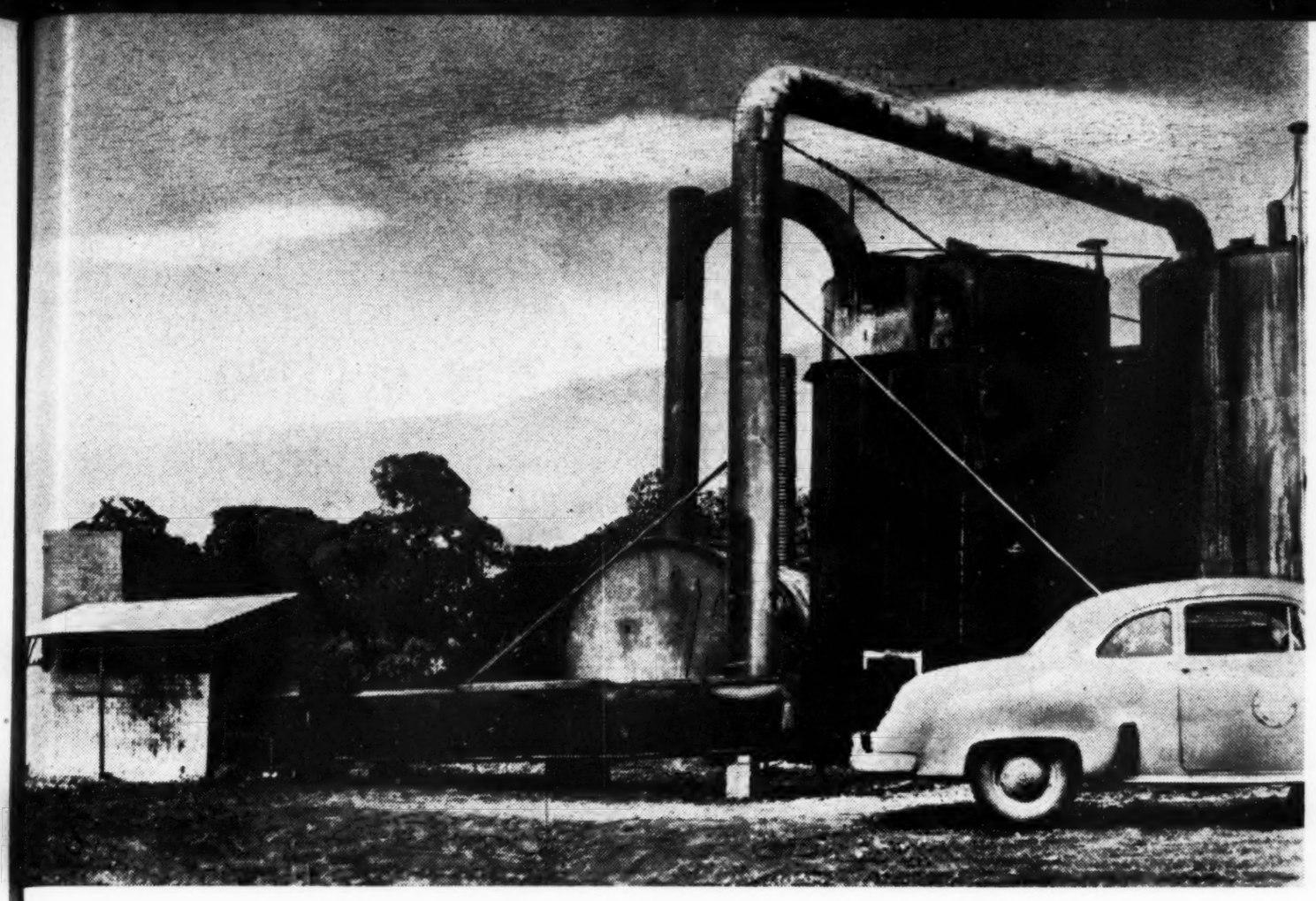
One of the nicest features of the Round-Up was that everybody got in the act. During the planning stages, good suggestions by the score were received from top management down through the entire supervisory group. The salesmen volunteered to keep the sales office open Saturdays (and they are not subject to overtime pay). General employees picked up the ball and really went places.

Customer service girls caught the spirit and showed up for work in cowboy shirts, dungarees, hats, and bandanas. This stimulated the executive office girls and the credit department to follow suit. Soon half the main office employees were in Round-Up attire. Yes, everybody got in the act.

The results obtained were considered quite satisfactory.

The unit sales of ranges constituted 93.6% of the budget figure and showed a 340% increase over the unit sales for the same period in 1948. The total dollar value of range sales amounted to 108% of the budget and represented 415% increase over the same period of 1948. The grand total of merchandise sales for the period was $108,689 compared with $57,025 for the same period in 1948, or an increase of $51,664.

Two hundred and two new customers were secured during the campaign.



THE FUME INCINERATOR that ended the objectionable odors emanating from the T. K. Roofing Manufacturing plant. At right are the two oxidizing tanks. The 18-in. steel stack in the foreground connects one oxidizer with the fume incinerator manifold, which in turn extends laterally to the incinerator oven at left. Sheet metal cover prevents rain from striking heated firebricks.

Gas Fume Incinerator Ends Plant's Objectionable Odors

By JOSEPH WILLIAM BAGGS

THE T. K. Roofing Manufacturing Co. of Chester, W. Va., located across the river from East Liverpool, Ohio, makes high quality roofing materials such as shingles, roll roofing, siding felts and related products.

In the production of these items, asphalt plays a very important part. The processing of asphalt produced the problem of fume incineration. Processing the asphalt involved thermal reactions. Fumes were created which contained many substances in both gaseous and liquid states.

The liquids consisted mainly of globules of light oils on up the line to heavy asphalt. The "raining" of these oils created quite a problem throughout the immediate area. The gaseous substances were made up of vapors from gasolines, up the line to many complicated and complex gases of the hydrocarbon series.

An objectionable odor was created. It permeated the surrounding Ohio-West Virginia area for many miles.

Since the T. K. Roofing plant adjoined a highly populated area, there were a great many complaints. Ill will growing rapidly demanded the creation of a satisfactory remedy. The first attempt at eliminating the cause of the objections involved a settling tank equipped with water sprays. This method succeeded in eliminating the majority of the oil globules. But it had no effect on the objectionable odors of the fumes.

Gas Takes Over

With the failure of this method, The Manufacturers Light & Heat Co. entered the picture. Industrial engineers of the gas company, upon learning of the plant's extreme difficulty, offered to try to solve the problem. The gas company studied the plant operation and processes. It then proposed to utilize thermal reactions to oxidize completely all of the substances contained in the fumes. This, it was felt, would remove source of all the objections.

The gas company's final drawing and specifications for such a "fume incinerator" were submitted to and approved by the management of T. K. Roofing.

The fume incinerator consists of an 18-in. steel stack running from the discharge outlet on top of the oxidizing tank. It curves over and down to ground level where it enters into a steel manifold.

At the point of entry into the manifold the stack was provided with an adjustable blast-type gate to control the pressure and velocities of the fumes. This precaution was necessary in order to insure against possible back-flashing into the oxidizing tank.

The 2 ft x 2 ft manifold, constructed of heavy steel welded sheets, was designed with two explosion caps. One is on top and one is at the end near the stack. The manifold is 20 ft long, with the last 6 ft narrowing down to a 6-in. width, and is provided with an adjustable blast-type gate. This gives an adjustable port area for the fumes much the same as the port incorporated in all gas burners.

Gas Burners

Thus, with pressure indicators on both the stack and the manifold, it was an easy matter to obtain pressures desired to be able to operate well within safe limits.

At the end where the adjustable port area was placed, the incinerator oven was built. This oven was constructed entirely of fire brick. It is 4 ft x 4 ft x 16 ft with a 12-ft stack of brick at the end. The inside section of the oven was built up with checker work to provide surfaces for fuel contact and ignition when heated to incandescence. It also caused a turbulence that would insure complete burning of all the fumes.

In addition to the fuel provided by the fumes, natural gas burners were installed to fire parallel to the flow of the fumes. These 4-in. inspirator type burners are used for preheating the oven up to the ignition point of the fuel in the fumes, and then maintaining operating temperature. The preheating input is 840,000 Btu per hour, and the maintenance input 400,000 Btu per hour.

The temperatures within the oven range upwards to 2400° F.

This unit is operating very successfully. It is completely incinerating all the fumes at a very low cost, with the result that no objectionable fumes are escaping into the air.

Mr. Baggs is industrial gas engineer for the Manufacturers Light & Heat Co., East Liverpool, Ohio.

USING NATURAL GAS In a manufactured gas system

By E. G. BOYER

Part 2 of a two-part article, the first of which appeared last month, discusses the advantages and disadvantages encountered by the Philadelphia Electric Co. in using natural gas in its system.

UP to this point we have endeavored to explain our system: its operation, the methods of control used, and the troubles we have had. We are now ready to bring to your attention the ways in which we try to make the most use of the good features of natural gas and avoid its poorer ones.

The uniform quality of natural gas simplifies its use on jet compressors because it produces a uniform product. Uniformity enhances its value as a compressor engine fuel through close adjustments for engine economy. Interchangeability calculations are more reliable when the quality of one of the major constituents is uniform.

Natural gas, being a sulphur-free gaseous raw material, can be added as an enriching agent and as a natural gas-air mixture through jet compressors at the storage holder inlet, thereby eliminating the use of generator, offtake main, cooler, relief holder, exhauster, scrubber, purifier, and yard piping that would be required if it were a sulphur-bearing material.

Supplies Grow

The ever increasing reliability of natural gas supply as a result of line interconnections, improved construction materials, and improved line operation is important. Natural gas is paid for after it is received, thus eliminating costly storage facilities and large inventory charges on which interest must be paid.

The various ways in which natural gas can be used help us to take advantage of changing conditions. It can be reformed, using a relatively small amount of coke; it can be catalytically cracked, using no solid fuel; it is a good enriching agent; and it is a good fuel for compressors, boilers, and for coke oven underfiring. It is delivered under pressure, practically eliminating handling charges.

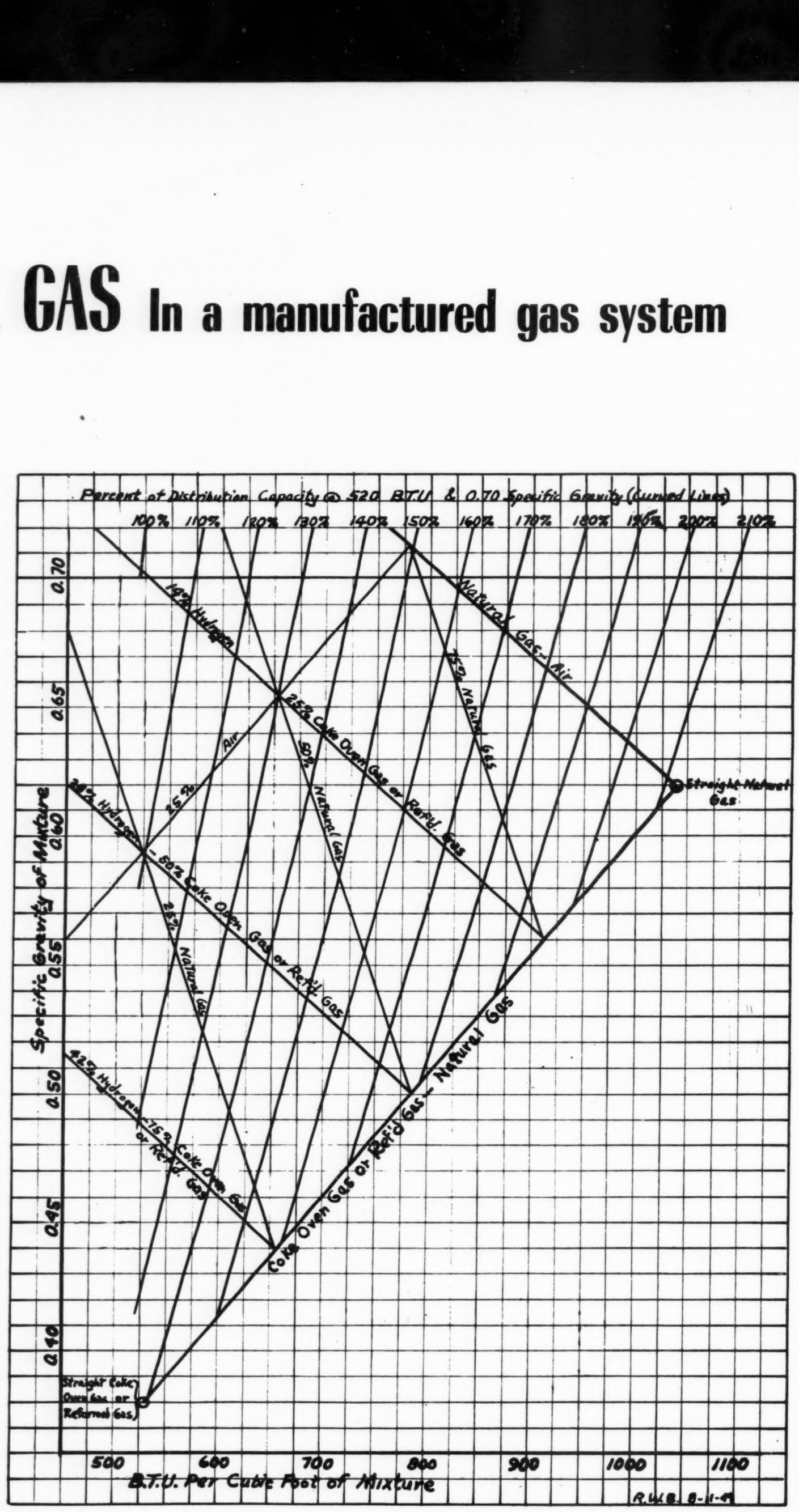


Fig. 8. Increase in main capacity that results from increasing heating value and decreasing specific gravity, in a high gravity area.

Natural gas is a low cost raw material when used at a high load factor. Our provisions to use it for enriching, reforming, with jet compressors, and as compressor and boiler fuel allow us to operate at a reasonably high load factor and still meet peak sendouts.

The high heating value and low specific gravity of natural gas promote its use for increasing the heating value of the gas distributed with the resulting increase in pumping capacity, main capacity, and customer meter capacity. A change from a 520-Btu, 0.69-sp gr gas to a 600-Btu, 0.60-sp gr gas will result in an increase of 15% in pumping and metering capacity and 23% in main capacity.

Fig. 4 illustrates the increase in main capacity that results in our high gravity area from increasing heating value and decreasing specific gravity. The graph also shows the composition of the gas

resulting from mixing coke oven gas or reformed gas with natural gas and air to produce a sendout gas of a particular specific gravity and heating value. As an illustration, a gas of 800 Btu and 0.60 sp gr would increase the main capacity to 167% of the present capacity. The gas would contain 66% natural gas, 10% air, and 24% reformed gas. The hydrogen content of the sendout gas would be 14%.

Easy to Use

The absence of impurities of a serious nature in natural gas makes it easy to use for the regulation of the quality of the gas produced. Automatically operated enriching controls work very well, resulting in a uniform heating value of the finished gas.

The slow burning characteristics of natural gas compared to manufactured gas present some problems which are not easily overcome. Some industrial applications are specifically designed for a slight variation in heat input on their burners, and consequently it is very hard to burn enough of the slower burning gas to maintain uniform production. A condition of this sort can usually be overcome by the use of better or larger burners. The manufacture of a gas that will completely substitute for natural gas is at present not economically possible. All manufactured gases burn faster than natural gas, or produce yellow tip difficulties. Luckily, reasonably large percentages of manufactured substitute gases can be used without having a serious effect on appliance operation.

Natural Gas Disadvantage

The high cost of natural gas, when used at a low load factor, is its most serious disadvantage. The natural gas pipelines supplying gas from Texas to this area must have a year around income in order to operate at a profit. The natural gas is, therefore, sold under contracts which insure this income. A yearly charge is made for the maximum quantity of gas that is to be delivered. This is called the demand charge. The next charge is the cost of each cubic foot or therm of gas that is used, called the commodity charge. The combination of these two charges per therm of gas used, when using the full contract quantity, is likely to be lower than the cost of any other suitable gas-making material. If the gas used is only half of the contract quantity for a year, then the combination of these two charges per therm of gas used will be considerably higher and may not be less than the cost of some other suitable gas-making material, such as oil. The total percentage of gas available that is used is called the load factor—a very important figure in determining the cost of natural gas.

A third factor that affects the cost of natural gas is the minimum contract quantity. If the minimum contract quantity is 75% of the maximum, it means that there is an obligation to pay not only the demand charge and commodity charge for the gas used, but also for the gas that is not used up to the 75% maximum. A 50% load factor with a 75% minimum contract would make the average cost of natural gas very high. A simple example of the effect of load factor and minimum contract quantity will illustrate how they work. The yearly demand charge for ten therms of natural gas might be $30. If the ten therms were used every day the total amount delivered would be 3650 therms for the year. At a commodity charge of 3 cents a therm, the total cost would be 3650 therms x 3 cents per therm plus $30 = $139.50 or

$$\frac{\$139.50}{3650} = 3.82 \text{ cents per therm.}$$

At a 50% load factor, 1825 therms would be used during the year, costing $84.75 or 4.64 cents per therm. If a 75% contract minimum were in effect, the cost would be $112.12 or 6.12 cents per therm.

The proper balance between the contract quantity of natural gas and the maximum daily sendout is important. In our system, the extra gas consumed when the temperature is approximately 40°F is only 5% of the total annual sendout in an average year. To put it another way, if the gas business were a movie theater and we had a capacity for 40 people, the number of admissions we would lose from 60 people trying to attend once in a while during the season would only be 5% of our annual revenue. It requires 32% of the production capacity to manufacture the additional gas required when the temperature drops from 40° to 5° F.

Cost Prohibitive

If we purchased natural gas to provide this peak load production capacity, the cost would be very high. A better answer is the installation of production equipment with a low investment cost even though the operating costs appeared to be high. The low percentage of the total gas that it would be necessary to produce on this equipment would have a small effect on the average yearly production cost. If 5% of the gas cost 10 cents per therm to produce, and 95% cost 4 cents per therm to produce, the average cost would be 4.3 cents or 7.5% above the base gas cost.

We have made forecasts which indicate that increasing the heating value of our sendout gas to 600 Btu would result in economies that would be of material benefit to the company. Our plant capacity and pumping capacity would be materially increased, and the 23% increase in the main capacity in the high gravity area would reduce the investment required for transmission and distribution reinforcements.

Interchangeability tests indicate that we can go to 600 Btu without any major changeover expense. However, forecasts indicate that our maximum load will increase about 50% in the next five years. We are, therefore, studying the additional advantages of a sendout heating value higher than 600 Btu to see if the advantages will more than offset the cost of a major changeover. There are several other problems, such as interchangeability, load factor, and availability of the proper raw materials which would have to be worked out before we could even go above a 600-Btu sendout gas.

Mixed Beats Natural

The high cost of using natural gas for peak loads, the difficulty of producing a good substitute for natural gas, the availability of coke oven gas in our territory, the probability that adequate quantities of natural gas will not be available, and the slow burning quality of straight natural gas lead us to believe that a high-Btu mixed gas will be better than straight natural gas. Changeover costs and customer inconvenience would be reduced considerably if a mixed gas were used rather than straight natural gas. Our studies indicate that a mixed gas program will allow us to secure the greatest volume of firm gas sales, provide a reasonably priced fuel to the greatest number of customers, and secure the maximum return on our investment.

Our company's policy is that we should be equipped to supply uninterrupted gas service at all times. Therefore, we must make investment in capacity to give continuity of service to meet the maximum demand regardless of natural gas failures.

Operating results for a number of years show that the companies that have been using a large percentage of natural gas have increased their sales, revenue, and profit to a much greater extent than manufactured gas companies. At the same time, their customers have been enjoying cheaper rates. Properly handled, this situation can continue for many more years. It would be wise, though, to invest more of the profits that result from the use of natural gas in research aimed at the time when the law of supply and demand will make the large volume manufacture of a high heating value, low specific gravity gas the life saver of the gas industry.

Economics of Elevating

GAS HEATING VALUE

By HALL M. HENRY

THE 660-Btu gas, representing a 25% increase in heating value, was first adopted although the company had planned, and technical and laboratory studies indicated, that there would not be any great difficulty in distributing a 687-Btu gas which would have given a 30% increase over the former standard of 528. The decision was made to stay at 660-Btu because of carbon difficulties the Framingham plant ran into when it attempted to go above 687 Btu. This was because of having insufficient air to provide extra heat needed to crack the additional oil required to produce a 687-Btu gas. We were very much surprised at the carbon trouble since a 687-Btu gas had previously been produced at the Worcester plant on similar equipment without carbon difficulty. Furthermore, all appliance tests showed that a 687-Btu gas was interchangeable on any appliance in proper adjustment on the 528-Btu gas.

The Worcester management decided to go to a 660-Btu gas in its Framingham division because the existing plant and local distribution facilities and transmission lines were overloaded. The Framingham plant supplies some 8800 customers in the Framingham division and 5700 customers in the Marlboro division of the Worcester Gas Light Co., plus approximately 9300 customers through an 8-in. high pressure line of the Dedham & Hyde Park Gas Co. Between 80% and 90% of all gas is compressed to 40-lb to 70-lb pressure. The Framingham plant at the time of conversion consisted of one 11-ft carburetted water gas set and one 9-ft plus one 1-MMcf holder. All auxiliaries were designed for an hourly capacity of 300,000 cu ft. In addition, the company had installed an LP-Gas plant with three 30,000-gal tanks and air diluters equal to 3800 Mcf per day. Thus, the daily design capacity was: carburetted water gas, 4200 Mcf per day from the 11-ft set, 2800 from the 9-ft set; total, 7000 Mcf; from the LP-Gas plant, 3800 Mcf per day.

The actual peak day in 1947-48, was 7000 Mcf. The estimated peak day was 8200.

The Framingham division was running into excessive labor and maintenance costs in order to keep the plant running to full capacity, and complaints of low pressure were so serious as to have aroused groups of customers to complain to the local council and to the Department of Public Utilities. In addition, the company had had to put in a curtailment order on heating. With this situation facing the management, it was obvious that something had to be done. The company gave serious consideration to going to 951-Btu gas, but decided against it as this higher-Btu gas had at the time only been made successfully using light gas oil; furthermore, holder costs per therm would have been greater than the costs per therm of carburetted water gas, and, finally, it seemed desirable to await development on the higher Btu gases using heavy oil.

A comparison of certain operating details will serve to illustrate the benefits this company has derived from 660-Btu gas. (All data on 528-Btu equivalent.) See *Table 1*.

The author is vice president, NEGEA Service Corp., Cambridge, Mass.

TABLE 1. COMPARISON OF OPERATING DETAILS

	Before	*After*
Water gas capacity, both sets (Mcf/day)	7,000	9,300
Water gas capacity plus LP-Gas	10,800	13,100
	12 Mo. June 1948	*12 Mo. June 1949*
Steam needs lb/Mcf	31	20
Oil gas/Mcf	3.80	4.14
Coke lb/Mcf	21.38	16.60
Boiler fuel lb/Mcf	23.80	17.70
Tar credit gal/Mcf	.95	1.03
F.O.T.S.[1] Costs		
Oil at 5.4 cents	20.52	22.36
Coke at $17.28	18.40	14.27
Boiler fuel at $9.76	11.61	8.64
TOTAL	50.53	45.27
Tar credit at 5.5 cents	5.23	5.66
TOTAL	45.30	39.61
Savings/Mcf		5.69

	Before	*After*	*% Change*
Unaccounted for 12 mo. (Mcf)	106,182	104,932	
Man hours production (6 mo.)	84,379	67,347	25.3% Dec.
Holder costs	72.0	64.8	10% Dec.
Mcf made	1,332,777	1,434,743	6.9% Inc.
Capital expenditure	None		
Customer conversion	$10,620		

Cost Per Customer

	Meters	*% Adj.*	*No. Ref.*	*Gross[2]*	*Out of Pocket[3]*
Framingham	8778	55.2	800	$1.18	37.4¢
Marlboro	5724	50.2	100	0.705	31.8¢
Dedham-Hyde Park	9246	53.2	800	1.38	42.3¢

[1]Fuel, make oil, tar, and steam.

[2]Gross adj. cost includes all costs per meter including payroll and material charges of all types.

[3]Out of pocket costs include only the overtime hours spent over a 48-hour week. (Company used regular personnel.)

This paper represents an economic analysis of the effect of producing and distributing 660- and 951-Btu gases in place of a 528-Btu gas. The data and conclusions for this analysis have been obtained from two years' experience in distributing a 951-Btu gas to some 51,000 customers at Cambridge, Mass., and on 14 months' experience with 660-Btu gas to some 24,000 customers supplied by two companies in Massachusetts, the Dedham & Hyde Park Gas Co. and the Framingham and Marlboro divisions of the Worcester Gas Light Co., and on two months' experience in changing to 660-Btu in the New Bedford Gas & Edison Light Co., the Milford Gas Light Co. and the Worcester division of the Worcester Gas Light Co.—comprising some 90,500 customers, thus making a total of 115,000 customers now on 660-Btu gas.

The decision to produce and distribute these higher Btu gases was based on an economic appraisal of the several methods at the companies' disposal for providing increased production and distribution capacities, both of which were sorely needed.

The above comparative results, being based on operating figures for the Framingham plant alone, may not reflect the true savings as oil and/or coke qualities may have improved over the two periods. That this has happened is evident by the following comparison made of two other companies in our group. *(Table 2.)* The saving of 1.38 at Worcester is due to factors other than better fuel. According to the local operating personnel, about one-half of 1.38 can be attributed to better fuels. Even after modifying the 5.69-cent/Mcf saving by the improvement resulting from better gas-making materials, which for Worcester and New Bedford was .69 and .79 cents, respectively, or average .74 cents, we see that there was a definite saving of at least (5.69 — .74) 4.95 cents per Mcf in F.O.T.S. costs.

Of even greater significance is a comparison of the holder costs for these three companies for the two 12-month periods. *(Table 3.)*

A typical plant gas analysis, shown in *Table 4* indicates that the specific gravity was increased but slightly. A sample of the 660-Btu gas and of a 528-Btu gas were sent to a laboratory for a mass spectograph analysis so a comparison could be obtained on the two kinds of gases. This is shown in *Table 5.*

Technical and laboratory findings indicated that all appliances (with the single exception of the refrigerator) would perform satisfactorily on 660 *provided they were in proper adjustment* on 528-Btu gas. Naturally all appliances were not in proper adjustment and hence some 50% to 60% of all customers had to be visited and the appliances adjusted. In the case of refrigerators, the Servel representative working with our men found that through the use of a certain size spud and a certain flame adjustment the refrigerators would work satisfactorily on either gas. Hence the refrigerator could be preadjusted before 660-Btu gas was introduced. This preadjustment worked so well that we had fewer refrigerator calls during the summer than in any previous period.

A customer opinion survey was made in January 1949 to determine how they felt about the "new gas." Results were 82.4% satisfactory (including 37.7% "no difference").

Jack Turnan, superintendent of the Framingham plant, listed the following plant advantages in his talk before the Operating Division of the New England Gas Assn. in June 1949:

TABLE 2. COMPARISONS WITH OTHER SYSTEM COMPANIES

	Framingham		Worcester		New Bedford	
	12 Mo. June		*12 Mo. June*		*12 Mo. June*	
	1949	*1948*	*1949*	*1948*	*1949*	*1948*
Oil	4.14	3.80	4.05	4.13	3.828	3.903
Coke	16.60	21.38	15.87	16.39	17.29	17.91
Boiler fuel	17.70	23.8	16.03	17.29	.....	.....
Tar at 25%	1.03	.95	1.01	1.03	.96	.98
Price						
Oil (cents/gal.)			5.4		4.6	
Coke			17.28		18.00	
Boiler fuel			9.76		.....	
Tar (cents/gal.)			5.5		5.5	
F.O.T.S./Mcf						
Oil	22.36	20.52	21.88	22.30	17.61	17.95
Coke	14.27	18.40	13.71	14.16	15.56	16.12
Boiler fuel	8.64	11.61	7.82	8.44	.....	.....
TOTAL	45.27	50.53	43.41	44.90	33.17	34.07
Tar	5.66	5.23	5.56	5.67	5.28	5.39
F.O.T.S.	39.61	45.30	37.85	39.23	27.89	28.68
Saving	*5.69*		*1.38*		*0.79*	

TABLE 3. HOLDER COSTS

	Framingham	Worcester	New Bedford
12 Mo., June 1948	72.0	61.3	54.5
12 Mo., June 1949	64.8	59.3	52.5
Difference	7.2	2.0	2.0

NOTE:—The actual holder costs per books have been adjusted to reflect the same unit fuel prices and tar credits for the two year periods so that the above differences are mainly due to improved efficiencies and lower labor and maintenance costs. The savings at Framingham are not entirely attributable to the 660-Btu gas, since a new 3 MMcf storage holder went into operation in January, 1949, and tended to improve the overall costs. Local personnel estimate that 3 cents/Mcf of the total savings are attributed to the new holder.

TABLE 4. REGULAR PLANT GAS ANALYSIS AND SPECIFIC GRAVITY

	660 Btu	*528 Btu*
CO_2	4.8	5.6
Ill.	13.1	8.6
O_2	0.6	0.5
CO	24.3	26.3
H_2	24.6	37.3
CH_4	20.8	9.9
N_2	11.8	11.8
Sp. gr.	.73	.72
Sp. gr.	.71	.69

Plant capacity increased 25%; efficiency of the sets greatly improved; steam per 1000 reduced 1/3, now ½; oil per 1000 increased .2 to .3, now .1 to 2.; coke decreased 4 to 6 lb per Mcf, now 7 lb; efficiency of gas compressors improved; fire cleaning time reduced; wash box cleaning periods reduced; separator troubles reduced; water content of tar reduced; reduction in steam allowed shutdown of one boiler; gas makers like operation much better; proposed installation of a new 11-ft set eliminated; amount of propane to meet peaks reduced.

Distribution advantages included these:

High bill complaints reduced; customer complaints reduced 30%; customer relations greatly improved; customer usability increased; gain of 25% in distribution capacity; peak hours reduced 25%; system pressures lowered; overtime reduced; taking on additional business permitted; smaller meter used; relaying services, formerly too small, prevented.

Management at Framingham has benefited in these respects:

Addition of new business permitted; overtime and regular hours of labor reduced, saving 25.3% in production man hours; capital expenditures for new sets, compressors, boilers, mains, etc., postponed; definite saving of 2 cents per Mcf effected in holder costs

TABLE 5. ANALYSES

All Figures are in Mol. Percent

	660 Btu	*530 Btu*
Xylenes	0.02 P.T.	0.01 P.T.
Styrene	0.01	0.02
Toluene	0.24	0.19
Benzene	0.94	0.69
Pentanes	.....	.....
Pentenes	0.02	0.03
Cyclopentadrene	0.16	0.09
Butanes	0.05**	0.05**
Butanes	0.45	0.38
Butadiene	0.48	0.32
Carbon dioxide	4.08	8.71
Propane	0.10**	0.10**
Propylene	2.54	1.68
Oxygen	0.08	0.51*
Ethane	2.53	1.69
Ethylene	9.32	6.79
Acetylene	0.10**	0.10**
Methane	14.51	10.74
Carbon monoxide	23.10	14.42
Nitrogen	11.68	25.90
Argon	0.14	0.32
Methyl acetylene	0.10**	0.10
Hydrogen	29.70	27.50
Indene	0.02	0.02
Naphthalene	None	None

**P.T. below.

*The large amount of oxygen may have been due to an air leak in one of stop cocks, which was streaked.

Hourly Set Capacity

	528 Btu	*660 Btu*		
	Hourly	*Hourly*	*Equiv. 528*	*Gain*
11-ft set	210,000	212,100	263,500	25%
9-ft set	139,280	148,700	185,882	33%

Comparison of Fuel Results on Two Sets

	No. Days	*Coke*	*Oil*
11-ft	15	15.5	4.15 on Equiv. 528
9-ft	30	16.4	4.10 " " "

NOTE:—Fuel bed is carried much lower than on 528-Btu gas. Reduction in steam had no effect on clinker formation. Fire is cleaned every day, requiring about 2 hours. No increase in carbon deposit or plugging of checker brick is noted. Wash box cleaning cut one-third.

equal to $28,500 per year; number of low pressure complaints, which had become serious, reduced.

Because of the satisfactory operating and utilization results at Framingham and Dedham & Hyde Park, and because of the need for some additional distribution capacities at our New Bedford company and in the balance of the system of the Worcester Gas Light Co., a decision was reached in January this year to convert these two systems to 660-Btu gas. Since the Worcester plant also served the Milford Gas Light Co., one of our own properties, and also the gas customers of the Wachusetts Electric Co., a New England Electric subsidiary, these two properties were included in the change.

Based on previous experience, the companies established a complaint pattern showing the expected number of complaints for each week following the introduction of the 660-Btu gas. The actual complaints at a certain stage fell to such a low point that the companies inserted ads to call attention to the desirability of calling in to have appliances properly adjusted. These ads did stimulate additional calls.

As all conversion costs were not available at the time this paper was written, the following represent actual plus estimated costs to complete the customer appliance changes:

	Gross Costs
Milford	1.27/cust.
Worcester	1.36/ "
New Bedford	1.70/ "

In addition to the costs of customer appliance changes we had a net revenue loss due to inability to bill for the increased Btu sent out during the first month. These losses were estimated to be:

	Net Revenue Losses
Milford	$ 1400
New Bedford	20,000
Worcester	42,000

Conversion expenses, including the cost of unbilled gas, are being written off at the rate of 40% in 1949, with the balance over a five-year period.

It should be pointed out the savings in F.O.T.S. and holder costs are expected to be less in the case of New Bedford and Worcester division when compared with those realized at Framingham. This is because these two companies were not having to force their plants to obtain the required capacity and hence operating and maintenance costs were normal. *Table 6* gives comparative fuel data covering a 3-month period for the two companies. It is expected that after the personnel becomes more familiar with the new conditions, operating results will show some slight savings in F.O.T.S. costs. Worcester reports it has been able to reduce water gas-making personnel by 25%.

More Ease, More Enthusiasm

During the first three months these companies used 660-Btu gas they found their operations easier and customers enthusiastic about the new gas. Management and sales executives are pleased since it has been possible to remove restrictions on sales. The importance of this removal of restrictions is evidenced from fact that New Bedford, for instance, has added some 1500 new house heating customers this year and expects to add 500 more before the year ends, making a total of 2000 heating customers added since the decision was made to go to 660. At Worcester, the company has been able to take on several million cubic feet more industrial gas load which it had previously been unable to supply because of inadequate transmission capacity. There is little doubt in anyone's mind of the very great value that 660-Btu has meant to these companies.

In spite of the steps taken to increase capacity of these

TABLE 6. COMPARATIVE FUEL DATA

	New Bedford *July-Aug.-Sept.*		**Worcester** *July-Aug.-Sept.*	
	1949	*1948*	*1949*	*1948*
Oil/Mcf	4.09	3.89	4.02	4.03
Coke/Mcf	15.36	15.50	15.16	15.20
Steam lb/Mcf (used)	18.6	21.3	18.00	29.20
Tar gal./Mcf	.818	.778	.804	.806

	New Bedford *July-Aug.-Sept.*		**Worcester** *July-Aug.-Sept.*	
	1949	*1948*	*1949*	*1948*
The F.O.T.S. were based on unit prices of:				
Oil (cents/gal.)	5.		5.5	
Coke ($/ton)	18.00		17.80	
Tar (cents/gal.)	5.		5.	
Steam (cents/M lb)	75		75	

	New Bedford		**Worcester**	
	Before	*After*	*Before*	*After*
Oil	19.45	20.43	22.17	22.11
Coke	13.85	13.82	13.53	13.49
Steam	1.60	1.40	2.19	1.35
TOTAL	34.90	35.65	37.89	36.95
Tar Credit	3.89	4.09	4.03	4.02
F.O.T.S.	31.01	31.56	33.86	32.93

companies by 25%, restrictions on sales have had to again be inaugurated. This means that before additional sales can be permitted plant capacity or distribution capacity or both in some instances must be increased. This raises the question as to what should be done. Fortunately a practical and economical solution is at hand through the adoption of 951-Btu gas and heavy oil as will be seen from what follows.

What Lies Ahead?

WE have seen what 660-Btu gas can accomplish and since these companies now find their capacities again inadequate let us see what lies ahead should they go to 951-Btu gas.

Many of the details in regard to the operating and economic results of using high-Btu oil gas at Cambridge have already been told. However, it was thought advisable, in this broader treatment of the economic results of elevating gas heating values, to include certain pertinent data previously revealed and some only now available. By including the results on 951-Btu gas a comparison can be drawn as to the relative benefits of 660- or 951-Btu gases.

The reasons for Cambridge adopting a 951-Btu gas were briefly as follows:

Connected loads exceeded the available plant and distribution capacity.

It was impossible in time available to secure and have installed in time additional carburetted water gas capacity.

An economic study made at the time, based on available data, showed that a 951-Btu gas could be produced at no more than 1 cent per Mcf above holder cost of carburetted water gas.

The changes to plant could be made in time to meet the expected demands.

The plant costs would be negligible.

Customers' appliances could in general be converted satisfactorily.

The expense of appliance conversion, while a sizable item, would be amortized over a period of years and also partly offset by federal taxes.

Plant and appliance changes are of the same general type as would be required for natural gas which is expected in New England at some future date.

Faced with this analysis, the company, which had been considering the advantages of high-Btu gas over a period of years, decided to convert to 951-Btu gas.

The Cambridge company has now operated on 951-Btu gas since August 1947. During this period it has had an opportunity to appraise the impact on earnings and operating results of sharply rising fuel prices; of deterioration in oil qualities; and lately of falling fuel prices and now again rising fuel prices. There has also been the opportunity to compare Cambridge results with others. The following are some of the highlights of this two years' experience.

Estimated Costs

The company installed the "twin generator" oil gas process manufactured by The Gas Machinery Co. of Cleveland. The cost of plant changes amounted to some $110,000 gross and after retirements was less than $40,000. In addition the company installed an LP-Gas-air plant to be used as standby. The total net additions (including an oil scrubber) amounted to approximately $130,000, bringing the net production plant investment to $2,223,123.

Had it been possible to install in time additional carburetted water gas equipment, the estimated cost for new plant to provide equivalent capacity would have been $3 million—or with the existing investment the net plant would have been $5,193,123.

The Cambridge company is now completing the installation of equipment to permit the use of heavy oil. These changes consisted of converting one of the three existing twin generator sets to a Hall heavy oil 4-shell set. This was accomplished by relocating what was the original generator of the water gas set alongside the old carburettor and installing a new superheater shell along side of the old superheater. The estimated costs are $80,000.

In addition the company has installed a new 2-shell set which incorporates all of the features of the Hall set but accomplishes this in two shells instead of four. The estimated cost is approximately $180,000.

The existing oil gas building is being extended 40 ft to house the new 2-shell set and the new parts of the 4-shell set. This is estimated at $50,000.

A blower and miscellaneous items bring the total to $325,000.

With these changes the new net production plant investment will be $2,548,120. There will be certain retirements to be deducted from these figures when the new changes are completed which will represent those plant changes made to use light oil and which are no longer needed. These retirements will not make a material difference in the conclusions.

Using the net plant investments for the several methods of producing gas we can calculate the effect of fixed charges on the cost of gas. For our purposes the fixed charges have been computed at 13% and are based on a recent annual production figure of 2,608,000 Mcf. The comparative fixed

TABLE 7. COMPARATIVE FIXED CHARGES

	Carburetted Water Gas	Oil Gas	
		Light Oil	Heavy Oil
	Actual plus Estimated	*Actual*	*Actual plus Estimated*
Net Plant investment	$5,193,123	$2,223,123	$2,548,120
Fixed charges at 13%	675,106	289,000	331,256
Fixed charges per Mcf	26¢	11¢	12.7¢

TABLE 8. COMPARISON OF PRODUCTION COSTS

	September 1949 Prices		
	Carburetted Water Gas	*Oil Gas*	
		Light Oil	*Heavy Oil*
Operating Results (528 Equiv.)			
Oil/Mcf/gal.	3.62	5.70	6.45
Coke/lb or tar gal./Mcf	19.06	.74	.....
Boiler fuel/lb/Mcf	14.5	8.5	8.5
Tar credit/gal/Mcf	.8690	1.14	1.27
Light oil credit/gal/Mcf	.0425	0.141	.19
Unit Fuel Prices			
Oil cents/gal	5.0	8.0	5.0
Coke $/ton	16.00	.....	.....
Boiler fuel (coke breeze) $	6.57	6.57	6.57
Tar - cents/gal	5.5	5.5	5.5
Light oil recovered, cents/gal.	8.0	8.0	8.0
F.O.T.S. cents/Mcf			
Oil	18.10	45.60	32.29
Coke or tar	15.25	4.07	.....
Boiler fuel	4.77	2.80	2.80
TOTAL	38.12	52.47	35.09
Less tar	4.79	6.27	6.99
Balance	33.33	46.26	28.10
Less light oil	.34	1.13	1.57
Total F.O.T.S.	32.99	45.13	26.53
Labor and maintenance costs cents/Mcf			
Labor	6.78	5.50	5.50
Miscellaneous works expense	.95	.95	.95
Maintenance	3.28	3.28	3.28
Total Other	11.01	9.73	9.73
Holder costs	44.00	54.86	36.26

charges are shown in *Table 7*.

Table 8 is a comparison of production costs prepared by G. G. Howie, Cambridge vice president, but adjusted by the writer to reflect current fuel prices. All but the heavy oil high-Btu oil gas are based on actual company results. The heavy oil high-Btu figures are based on the Baltimore tests using the Hall process.

Relative Costs Vary

Table 8 clearly shows the relative F.O.T.S., labor, and maintenance costs and holder costs for producing gas under the three conditions outlined. These relative costs will vary depending on the prices for the various fuels used and the amount received for tar and light oils recovered. For instance, in May 1947 (when the decision was made to go to high-Btu oil gas using light gas oil) the comparative price for heavy oil (special premium type) the company was then using was 5.62 cents vs. 7.02 cents for light gas oil, a difference of only 1.4 cents per gal. At today's prices there is a 3.0-cent difference and just prior to the recent jump in heavy oil the difference was 3.5 cents per gal. Were 1947 relative oil prices available today, the holder cost of high-Btu oil gas (using light oil) would be 5.64 cents more than carburetted water gas, instead of 10.86 as of today. On the other hand the holder cost of oil gas using heavy oil at 1947 prices is only 2.69 cents less than carburetted water gas, whereas at today's prices there is a 7.74-cent saving in favor of high-Btu gas using heavy oil. *Table 9* will show the relative costs of oil gas using light oil and heavy oil vs. heavy oil *carburetted water gas* at the oil prices shown. Other fuel and labor costs are assumed to remain constant.

Holder cost represents only the production costs. The true relative price must include the fixed charges on the different investments required to produce gas with the various fuels. *Table 10* clearly shows the impact of the fixed charges (previously calculated when added to the holder costs) :

TABLE 9. RELATIVE COSTS USING DIFFERENT PROCESSES

	Carburetted Water Gas	Oil Gas	
	Using Actual Data	*Light Oil Using Actual Operating Data*	*Heavy Oil Estimated on Baltimore Results*
1947 Fuel Prices			
Oil prices	5.62	7.02	5.62
Holder costs	43.78	49.42	41.09
1948 Fuel Prices			
Oil prices	8.0	10.34	8.0
Holder costs	54.10	67.35	53.20
1949 Fuel Prices			
Oil prices	5.0	8.0	5.0
Holder costs	44.00	54.86	36.26

TABLE 10. IMPACT OF FIXED CHARGES

Total Cost of Gas cents/Mcf

		Oil Gas	
	Water Gas	*Light Oil*	*Heavy Oil*
1947 prices	69.78¢	60.42¢	53.57¢
1948 prices	80.10	78.35	65.90
1949 prices	70.00	65.86	48.96

TABLE 11. UNACCOUNTED-FOR

Before Change	Cambridge	Company A	Company B
1946 (12 mos.)	112.151	86.159	180,769
1947 (12 mos.)	120,469	84,902	279,695
After Change			
1948 (12 mos. July)	178,169	98,189	266,529
1949 (12 mos. July)	116,675	89,694	369,533

It is interesting to point out here than an independent firm of engineers, hired by the Massachusetts Department of Public Utilities to aid it in an investigation of the company's rates, testified that the company had saved from 4 to 7 cents/Mcf by going to high-Btu-oil gas instead of continuing with carburetted water gas. The above figures show that at 1947 prices on the light oil which the company was using there was a saving of 9.36 cents per Mcf. At today's relative prices the savings are 4.14 cents on light oil and are expected to reach 21.04 cents per Mcf using heavy oil.

Costs At 528-Btu Gas

As pointed out previously, the company was also short of distribution capacity and would have had to enlarge its pumping equipment and mains, services, etc. It was estimated that a minimum of $750,000 would have been required. At 13% this meant an additional expense per Mcf of 3.7 cents that would have been imposed on the company had it continued with 528-Btu gas. It is difficult to estimate the additional capital savings which have been realized because services and meters do not have to be replaced whenever added loads are taken on, but these will be substantial as the company continues to expand its kitchen and house heating market.

The use of 951-Btu gas resulted in an expenditure of $580,000, which is being amortized over a 14-year period. The first year the company wrote off 40% of the changeover expense (equal to federal income tax on the total changeover expense). The annual write-off, equal to about 1.25 cents per Mcf, is negligible when compared with the 15 to 21 cents per Mcf that would have been assessed annually against the gas sales had the company been required to make capital expenditure projected to enable it to continue to use carburetted water gas instead of oil gas using heavy oil.

"Unaccounted-For" Therms

One added expense that must be assessed against the use of high-Btu gas is the larger "unaccounted-for" gas therms. If we take the increase in "unaccounted-for" as being proportional to the rise in heating value, Cambridge should have shown an 80% increase in its "unaccounted-for" gas. The actual Mcf "unaccounted-for" figures on a 528-Btu equivalent basis for the two years prior to the changeover and two years since are shown in *Table 11*. We have shown two other companies in our system so that allowances for weather conditions might be made by anyone interested.

If the "unaccounted-for" gas were assumed to have been increased in proportion to the increase in heating value, the extra cost would have amounted to approximately 1 cent per Mcf.

Another question that probably arises is how the increase in heating value has affected servicing costs. Based on reported service calls (and these include the turn-on and turn-off of heating equipment) and taking into account the fact that the number of heating customers has risen by 54% since the changeover, the calls are less today than pre-conversion. We cannot find any basis for thinking the service is greater with an increase in heating value of the gas.

State and Federal Gas Laws

New taxes, new regulations complicate interstate transmission problems

By REX G. BAKER

Director and General Counsel, Humble Oil & Refining Co., Houston

(Condensed from a paper presented at the annual meeting of the Independent Gas Assn. of America, Dallas, Oct. 31.)

IN recent years state legislatures have imposed special tax burdens upon natural gas. These burdens usually assume the form of severance or production taxes and taxes on the gathering of natural gas. At its last session, the Louisiana legislature increased to one cent per Mcf the tax on the gathering of natural gas. In the Texas legislature a persistent, but unsuccessful, effort was made to impose new taxes on the gathering of natural gas.

In 1948 the Louisiana legislature imposed an excise tax on producers of gas equal to the difference between the price received by the producer for the royalty owners' interest in the gas and the amount paid by the producer to the royalty owners for the gas. The state would ignore the terms of contracts between the producer and his royalty owners, and would assert the power to tax if the producer sells the gas for a price in excess of that for which he is obligated to settle with his royalty owners. This act has not been tested in the courts.

The New Mexico legislature passed an act this year granting producers of gas, as well as other producers of natural resources, an annual exemption from severance taxes on the first $200,000 of production. The commissioner of revenue has brought a declaratory judgment action, asserting that the exemption provision is unenforceable administratively. This act is evidence of a trend to shift severance taxes from small to large producers.

The recent case of *Memphis Natural Gas Co. v. Stone*, decided June 1, 1948, shows the limits to which a state may go in taxing interstate gas pipelines and all other interstate businesses having facilities located within a particular state. A Mississippi statute imposed a franchise tax upon corporations conducting business in that state, measuring the amount of the tax by the value of the capital locally employed. The Memphis company owned about 135 miles of gas pipeline and two compressor stations in Mississippi, but these facilities were used solely in interstate business.

The company paid ad valorem taxes on its properties located in Mississippi. While under old principles, a tax of the type here employed would be held to be an invalid burden on interstate commerce, the Supreme Court sustained the tax on the theory that it was a recompense for the protection afforded the company's local activities in operating and maintaining the pipeline. The court so held despite a stipulation in the lawsuit to the effect that the company obtained its only protection from the state through the ad valorem payments. This case considerably broadens the field in which local excise and franchise taxes may be imposed upon interstate businesses.

* * *

For a few years after the Natural Gas Act was passed, the FPC refrained from attempting to extend its jurisdiction into the forbidden field of production and gathering. However, based on expressions contained in the court's opinion in *Peoples Natural Gas Co. v. Federal Power Commission* (1942), it conceived the idea that jurisdiction over producing and gathering properties could be asserted under the language of the act. It then successfully extended its jurisdiction in a series of steps. It first placed producing properties and gathering facilities of natural gas companies in their rate bases and limited returns from such properties to about 6% on the depreciated cost.

This action was upheld by the Supreme Court in *Federal Power Commission v. Hope Natural Gas Co.* (1944). Encouraged by this success, the commission next took jurisdiction over the producing and gathering facilities of affiliated companies which sold their production to natural gas companies for transportation in commerce for resale. This action was upheld in *Colorado Interstate Gas Co. v. Federal Power Commission* (1945).

Following this, the commission conceived the idea that it could extend its jurisdiction over all production and gathering in cases where the producer sells to an interstate pipeline and the gas is transported across state lines and sold for resale.

In the case of *Interstate Natural Gas Co. v. Federal Power Commission*, decided June 16, 1947, arm's length field sales by Interstate to three pipeline companies which transported the gas across state lines were held to be sales in interstate commerce for resale and subject to regulation by the commission. The language employed by the Supreme Court in that case served to encourage the commission to believe that it could regulate any sale by a producer or gatherer to a natural gas company if the latter transported the gas across state lines and sold the gas for resale. This, of course, jeopardized the position of all producers and royalty holders who made sales to interstate pipelines, because in making such sales they faced the danger of being declared by the commission to be natural gas companies subject to regulation in such fashion as to enable them to realize only about a 6% return on the depreciated cost of their producing properties.

In 1947 the commission itself issued New Section 0379 of its Substantive Rules, stating it was of "the opinion that it was the intent of Congress that the control of production and gathering of natural gas should remain a function of the states and that the Natural Gas Act should not provide for regulation of those subjects," and providing that in administering the act the commission would construe the exemption in Section 1(b) so that the act would not apply to production or gathering "including arm's length sales of natural gas by independent producers and gatherers, made during the course or upon the completion of production and gathering." The issuance of this rule probably contributed to Congress' failure to enact the Moore-Rizley bill.

After the 81st Congress convened, the Lyle bill (H.R. 79) and the Harris bill (H.R. 1759) were introduced in the House, and the Kerr bill (S. 1498) was introduced in the Senate. When these

measures came up before the House and Senate subcommittees considering them, a 3 to 2 majority of the commission, headed by Leland Olds, reversed the position taken in the issuance of the substantive rule exempting arm's length sales from the commission's jurisdiction, and stated that if Congress failed to pass the proposed amendatory legislation, the commission would regulate certain arm's length sales by producers and gatherers and would consider any sale by a producer or gatherer to be a dedication of all the seller's gas reserves in the field from which the sale was made.

The House passed a modified version of the Harris bill. After hearings, the Senate subcommittee modified the Kerr bill so as to exempt only those arm's length sales made by an independent producer or gatherer not otherwise a natural gas company and not controlled by, controlling or under common control with a person otherwise occupying the position of a natural gas company; and as so amended reported the bill favorably. The Senate adjourned without voting on the measure; but the Kerr and Harris bills will be pending business when the Senate reconvenes in January.

The present state of affairs has led the states of Kansas and Oklahoma to take steps to prevent the FPC from confiscating the gas reserves situated in those states. The conservation agencies in both states have entered orders fixing minimum prices for the sale of gas in the field where produced. The Oklahoma order named a minimum price of 7 cents per Mcf, while the Kansas order, which was of an interim character, prescribed a minimum price of 8 cents per Mcf. The action by the Oklahoma conservation agency is now before the courts of that state for determination of its validity.

Duplication of Regulation

The controversy between state and federal jurisdiction rages on

By HARRY M. MILLER

Member, Public Utilities Commission of Ohio
President, National Assn. of Railroad & Utilities Commissioners.

(Condensed from a paper presented at the 31st annual convention of the American Gas Assn., Chicago, Oct. 17-20.)

IN 1938, the magnitude of the gas industry invited widespread public interest. Practices within the industry which were inimical to the public interest, and which were beyond the jurisdiction of the states, became evident. Certain segments of the industry had successfully sought freedom from regulation by the states and therefore from any regulation on the ground that they were engaged in interstate commerce. The states in return urged federal action and in 1938 the Natural Gas Act was enacted. Three years earlier electric utilities for similar reasons had been brought under federal control by the Federal Power Act of August 1935.

The state regulatory commissions—all of them, I think—believed that the jurisdiction which the courts had held they possessed had been preserved to them by these acts. As a matter of fact, it was in a considerable measure the activity of some of the state commissions in attempting to provide effective regulation that these acts were passed. It was therefore with hope and promise for advancement in state and interstate regulation that the Federal Power Act and the Natural Gas Act were accepted.

The president of the National Assn. of Railroad & Utilities Commissioners in his annual address to the association on Oct. 15, 1935, within less than two months after the enactment of the Federal Power Act, said:

> It is with a great deal of satisfaction that I refer to these federal enactments (referring to the Federal Power Act, the Motor Carrier Act, and others) and to the complete manner in which the rights of the states have been protected. . . We may properly take a great deal of satisfaction that the field of state regulation as respects these utilities has been so well protected.

But faith that their jurisdiction would not be molested was assured from a more authoritative source. In his address to the same association at the same convention, Claude L. Draper, then as now a member of the Federal Power Commission, concerning the Public Utility Act of 1935, said:

> The new utility act, in these provisions for assistance to state regulatory authority, proceeds upon the sound assumption that the power industry is primarily a local industry and that the primary regulation of the industry should rest with the state. The new act asserts federal authority only to the extent which is necessary to make secure the primary state control by closing up the gap in public regulation. The act specifically provides against any encroachment by the Federal Power Commission upon the proper sphere of the state. While the control of the interstate wholesale rates which is constitutionally beyond the power of the state is conferred upon the commission, the commission is ordered by the act to keep its hands off the local rates and that prohibition upon the commission applies even to those cases where the energy locally distributed is the subject of interstate commerce.

Now, what happened?

A partial answer is found in the case of *Jersey Central Power & Light Co. v. Federal Power Commission* (1943). The commission in that case held that Jersey Central, which did no interstate business whatsoever, was nevertheless subject to the jurisdiction of the commission solely because it exchanged power with another New Jersey company, so that some of the energy generated by the Jersey Central sometimes came to be consumed in New York. This finding was made in spite of the fact that all of the activities involved were subject to New Jersey law.

Experience with federal action under the Natural Gas Act is not wanting, as you well know. My own state is presently engaged in an effort to sustain in the U. S. Supreme Court the decision of the U. S. Court of Appeals for the District of Columbia circuit rendered in the case of the *East Ohio Gas Co. v. Federal Power Commission,* decided Feb. 14, 1949, wherein the court held that East Ohio was not a "natural gas company" as defined in the Natural Gas Act.

East Ohio is an Ohio corporation and for a half century has been engaged in the direct local distribution of natural gas. It serves a half million consumers in 69 Ohio municipalities including Cleveland, Akron, Massillon and Youngstown. In each of these municipalities it has a local franchise and sells direct to domestic, commercial and industrial consumers under rates either fixed by local ordinance or approved by the Public Utilities Commission of Ohio.

It sells no gas to distributing companies for resale, transports no gas for hire, sells to no industrial consumers except through local distribution lines, and it is conceded that it has no rates or services for others subject to FPC jurisdiction. Three-fourths of its supply comes from sources outside Ohio, which it receives from interstate pipelines and for which rates are fixed by FPC. High pressure lines transmit the gas from points of delivery from the pipelines to its city plants.

The company has been subject to regulation by the Ohio commission since the adoption of the Public Utili-

ties Act in 1911. Every phase of the company's activity—rates, financing, accounting and all other matters—are the subjects of regulation under the Ohio statutes.

In its Opinion No. 158 on rehearing issued Nov. 7, 1947, the Federal Power Commission said:

> Still another contention is that regulation by this commission will partially duplicate what is characterized as complete regulation by the State of Ohio. That contention apparently serves as premise for a claim that action by this commission would, in these circumstances, constitute an invasion of the regulatory area assertedly reserved by Congress to the state. But this conclusion is supported by neither the language nor the history of the act, even if its premise were sound.
>
> Let us, however, examine the premise. There is here no significance to the point, repeatedly made, that East Ohio has no property or activities outside Ohio. Even though that be true, the State of Ohio lacks power to confer upon its commission authority to require a certificate of public convenience and necessity for a transmission line used solely for transporting out-of-state gas, as for example, East Ohio's 112-mile line connecting with Panhandle.
>
> Any prior doubt as to whether this be so was resolved when Congress provided in Section 7(c) of the Natural Gas Act for national control of this very matter *(Illinois Gas Co. v. Public Service Co., Colorado-Wyoming Gas Co. v. Federal Power Commission)*. Moreover, it appears from the record that the Ohio commission does not require the filing of reclassification and original cost studies of gas plant. And even if it did, our jurisdiction would remain unaffected. For, as was said in *Connecticut Light & Power Co. v. Federal Power Commission*, with respect to jurisdiction under similar provisions of the Federal Power Act:
>
> " . . . once a company is properly found to be a 'public utility' under the act the fact that a local commission may also have regulatory power does not preclude exercise of the commission's functions . . ."
>
> The finding that East Ohio is, by reason of its operation of this transportation system, a "natural-gas company" will, as we view it, in no manner interfere with the exercise by the State of Ohio of its authority to regulate the operations of the company in its business of local distribution—the field of local regulation which the Congress has clearly reserved to the states.

In its brief in the court of appeals, counsel for the Federal Power Commission states:

> Beyond the point where petitioner's transmission lines connect with its "local systems"—that is, the town-border stations—jurisdiction clearly rests with the state. But petitioner's transportation up to that point, the Supreme Court said in unmistakable language, is interstate commerce national in character. As such, it is without the regulatory jurisdiction of the state. And it is precisely that transportation which Section 1 (b) brings within the jurisdiction of the Fedearal Power Commission.

In my opinion, and for the reasons I shall give, the assertion of jurisdiction by the FPC, to the extent which the commission and its counsel claim the Natural Gas Act authorizes, will do untold harm to state regulation in a situation such as is involved in East Ohio.

The people of the state of Ohio have seen fit to reserve certain powers to their local municipal governments through their state constitution. Among these is the power to fix and determine the rates which certain utilities, including natural gas companies, may charge for services rendered to the residents of their municipalities, and to prescribe such rates by ordinance. The municipalities have the further power to enter into contracts with respect to such rates and services.

East Ohio's Case

If a natural gas company is unable or unwilling to accept the terms of a rate-fixing ordinance, it may appeal to the public utilities commission whose duty it then becomes first to determine the reasonableness of the ordinance and if it is found to be reasonable the matter is at an end, subject to judicial review. If the ordinance is found to be unreasonable, the commission's duty is to fix and determine just and reasonable rates and to order such rates to be substituted for the ordinance rates.

Now with respect to East Ohio, it has local franchises with some 69 municipalities, and with most, if not all of such municipalities, has entered into contracts with respect to rates and services.

In addition to East Ohio's negotiations with these several municipalities, the public utilities commission has exercised its regulatory power in more than 250 proceedings, including rate case proceedings on appeal from city ordinances.

In any determination by the Ohio commission of just and reasonable rates it is obviously necessary to determine, among other things, the cost of gas purchased or produced, and in cases such as East Ohio, to determine the cost of transportation of the gas from the point of purchase or production to the point of contact with the distribution system of a municipality—the city gate. On the facts of East Ohio, this would involve an appropriate allocation of the transmission costs between all of the municipalities it serves. Historically, the Ohio commission has made just such an allocation. The commission has always considered that for all regulatory purposes the pipelines of East Ohio beginning at the point of contact with the interstate pipelines were subject to Ohio jurisdiction—especially so for rate-making purposes.

We are now confronted with the claim of the FPC and its counsel, as I have quoted them, that this segment, a vital one at that, is without the regulatory jurisdiction of the Ohio commission. If this is true, then what happens to rate regulation in Ohio?

Does it not follow that not only would the FPC fix the price which East Ohio should pay for purchased gas but in some way, on the assumption of its authority to do so, would it not be required to ascertain the costs of the transmission to each of the 69 municipalities which the company serves, both for the gas it purchases and also for the gas it produces within Ohio?

Sec. 5 (b) of the Natural Gas Act provides:

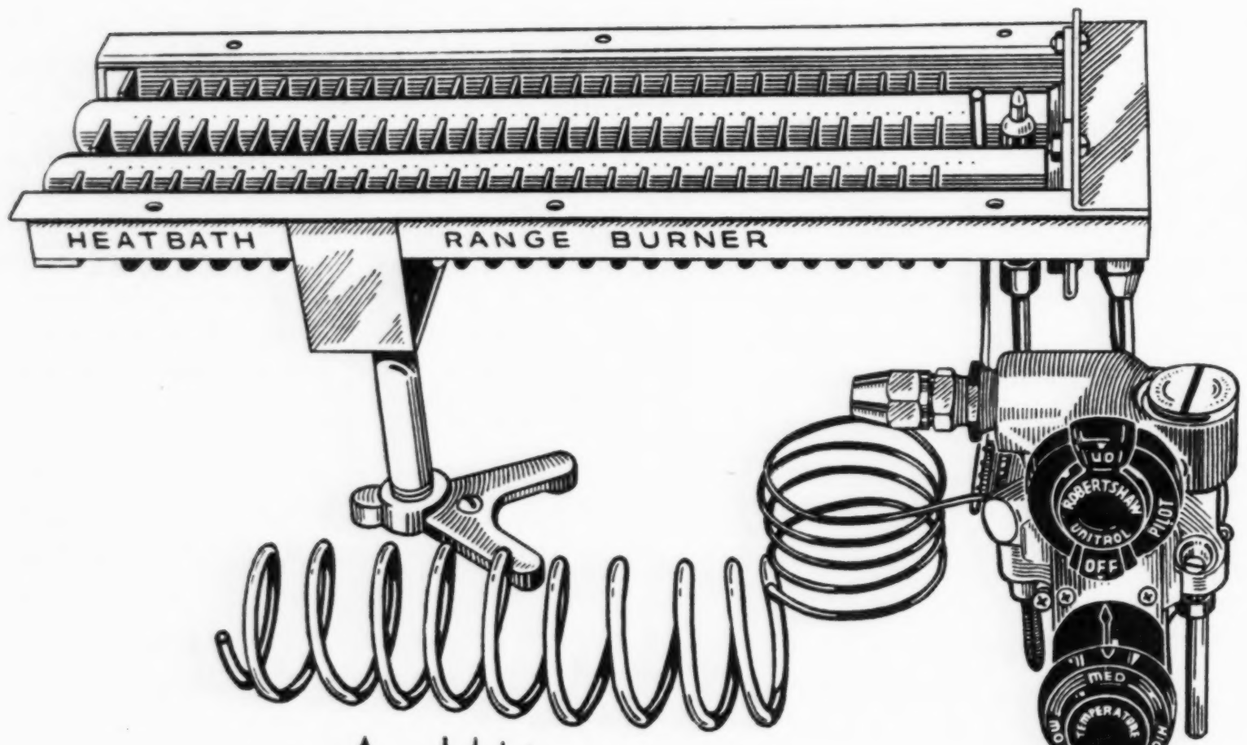
> "The commission upon its own motion, or upon the request of any state commission, whenever it can do so without prejudice to the efficient and proper conduct of its affairs, may investigate and determine the cost of the . . . transportation of natural gas by a natural gas company in cases where the commission has no authority to establish a rate governing the transportation or sale of such natural gas."

Would FPC Be Right?

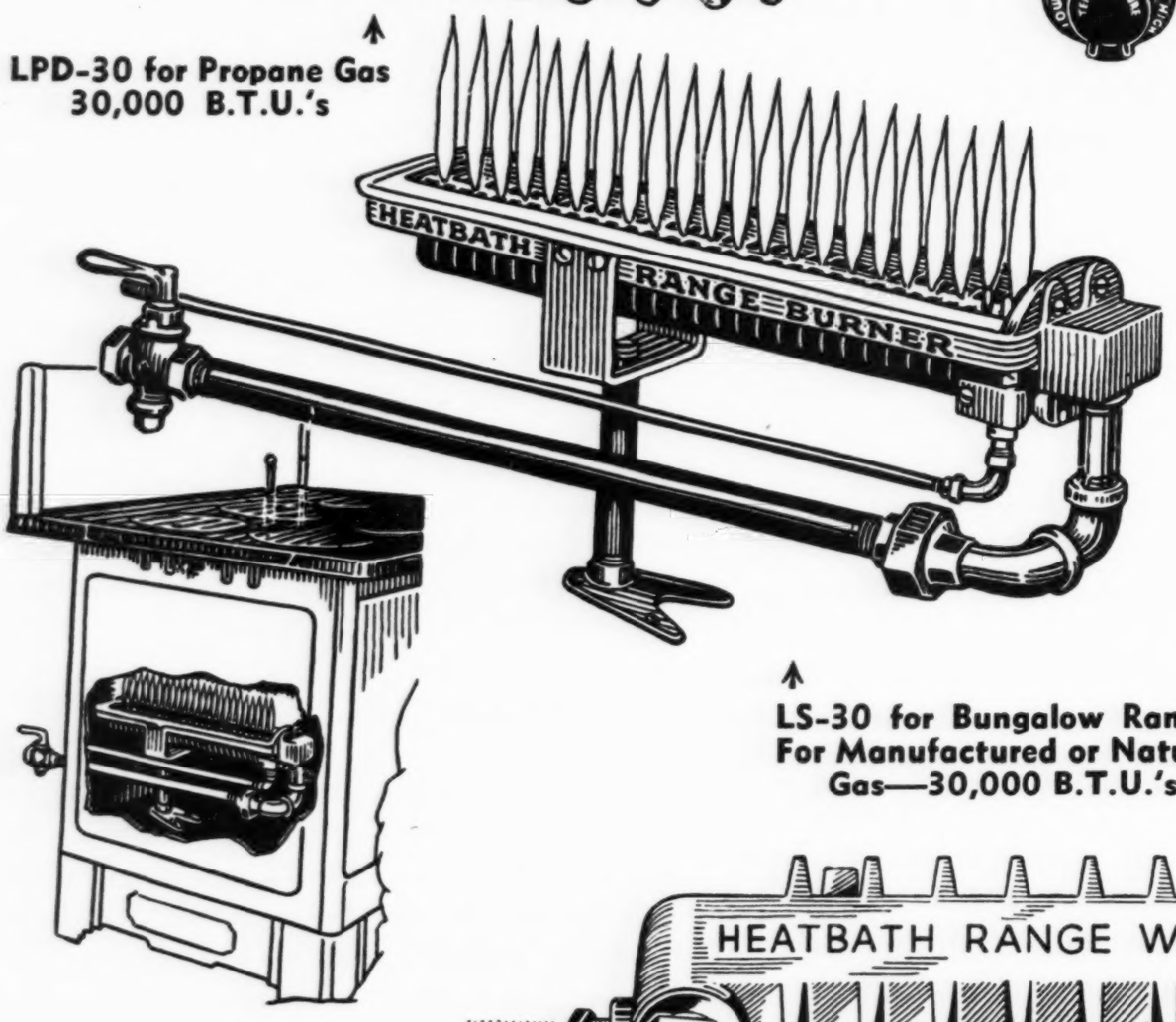
Would not the Ohio commission be bound in any rate determination to consider as one of the elements of cost, the finding of the Federal Power Commission with respect to such transportation costs? If this effect were to be given to such a finding I assume that East Ohio would insist that the finding be subject to judicial review. To qualify the finding for review a record and findings would have to be made by the FPC in the cost determination proceedings. But even then would the finding of FPC be a reviewable order since the same would not become operative upon East Ohio until the Ohio commission affirmatively applied the results of such determination? In *Federal Power Commission v. Hope Natural Gas Co.* (1943), the Supreme Court in its discussion of findings of the FPC respecting the lawfulness of past rates charged by Hope to East Ohio, said:

> The commission has no authority to enforce these findings. They are "the exercise solely of the functions of investigation. . ." They are only a preliminary, interim step towards possible future action—action not by the commission but by wholly independent agencies. The outcome of those proceedings may turn on factors other than these findings. These findings may never result in the respondent feeling the pinch of administrative action.

If, as counsel for FPC claims, the State of Ohio is without regulatory

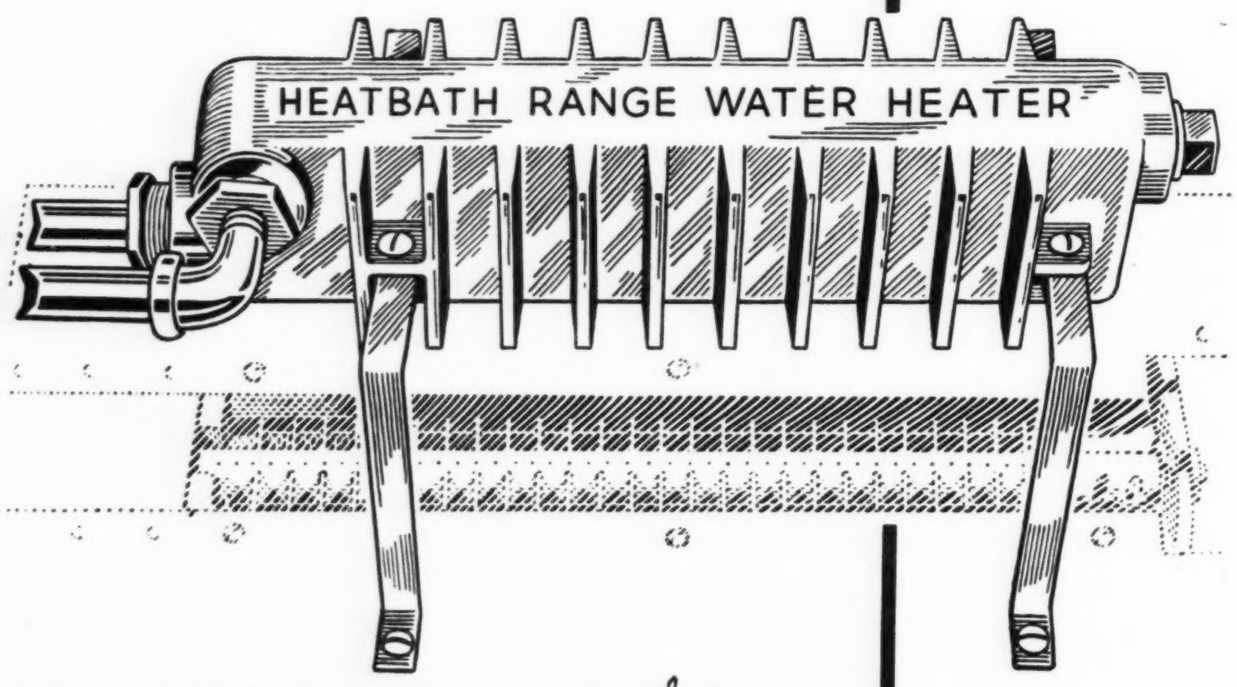


LPD-30 for Propane Gas
30,000 B.T.U.'s

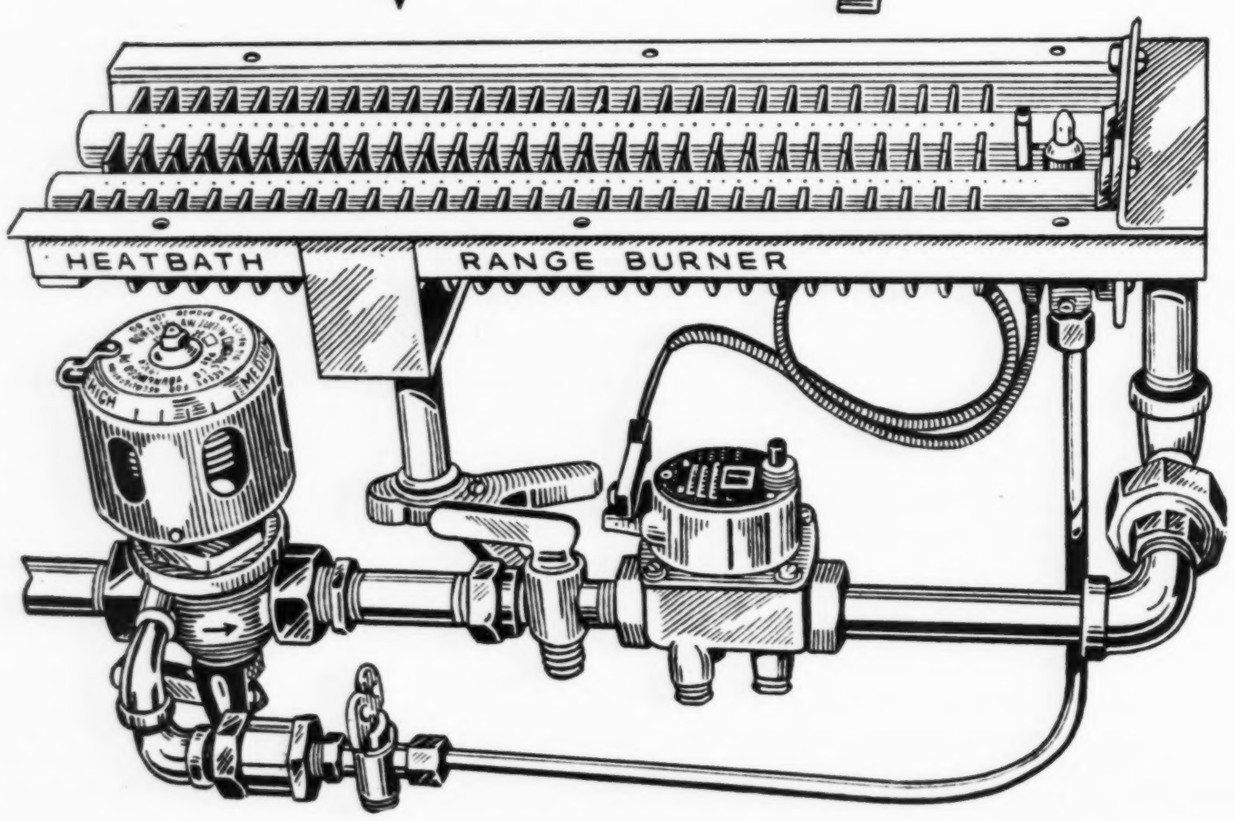


LS-30 for Bungalow Ranges
For Manufactured or Natural
Gas—30,000 B.T.U.'s

Water Heater in conjunction with Heatbath Conversion Burners. Up to 90 gal. hot water per day.



LD-40 for Dual Oven
Ranges
Up to 45,000 B.T.U.'s



The New
1950 Line of

Heatbath
KITCHEN HEATING BURNERS

Full Luminous Flame

BURNS

530- 660 B.T.U. Mfg. Gas
800 B.T.U. Mixed Gas
900-1100 B.T.U. Natural Gas

Change only the main burner orifice.

Write for Specification Sheets and Prices

Heatbath Conversion Burners are precision built. Designed by combustion engineers and backed by over 20 years of gas kitchen heating experience.

Heatbath Appliances
INC.

Post Office Box 78
SPRINGFIELD 1, MASS.

jurisdiction over East Ohio's pipelines except from the "town-border stations" to the consumers' burner tips, then how and in what manner can the Ohio commission or any municipality, except by some concurrent action by FPC, determine the price which the consumers should pay for the 25% of East Ohio's gas which is produced and comes from wells located in Ohio but which is transmitted in pipelines which FPC claims are under its sole jurisdiction?

Are the pipelines which carry simultaneously gas which is produced in Ohio, with that produced elsewhere, subject to the dual jurisdiction of the State of Ohio and the FPC?

Could the FPC authorize the abandonment of these pipelines which carry both gas which has moved in interstate commerce and that which has come from Ohio wells without regard to the laws of Ohio?

Will it be necessary each time that the Ohio commission is required to fix rates for any one of the 69 municipalities or for any of the service areas East Ohio serves, that the FPC determine the costs of the transmission of the gas served to each?

Will the FPC in the course of time have the power to say to East Ohio whom it shall and shall not supply natural gas irrespective of the desires of the municipalities of the State of Ohio and without the concurrence of the Public Utilities Commission of Ohio?

Cannot the FPC under its claim of authority regulate and control every natural gas company within the state of Ohio irrespective of the length of the "stub line" which feeds its distribution system?

I am advised that formal proceedings now involve companies doing business in Ohio, Indiana, Iowa, Illinois, Michigan and New York. The remaining 35 cases have been subject to commission staff studies and their identity has not been formally disclosed.

1950 Sales Promotion Calendar

AGA schedules 10-months' appliance merchandising program

By HUGH H. CUTHRELL
President, American Gas Assn.

(Condensed from a paper presented at the 31st annual convention of the American Gas Assn., held in Chicago, Oct. 17-20.)

HERE are the plans for 1950:

Our theme for the year is "The AGA Sales Revival." Yes, a revival of interest, a revival of our sales forces, a revival of our program of dealer relations, a revival of our good sales techniques, and a revival of interest in our customers. Here's the program. Watch it carefully. We need you behind it, adding your imagination and originality.

In *January* we're not going to have a special AGA promotion. If there's any old merchandise you didn't move in November and December, this will be the time to get it out—to put it to work for you. By this time your refrigerator plans for the new Servel box should be all set. Get behind it right away! Start your own refrigeration promotion on the new models early!

In *February* and *March* we'll have a "Size 'em Up" promotion on water heaters and gas clothes dryers.

Now this slogan has a double meaning. "Size 'em Up," as it applies to water heaters, places emphasis on sizing up your sales force as a prelude to the "Court of Flame" program which the water heater manufacturers will run later in the year. "Size 'em Up" also has a connotation for gas clothes dryers. During February and March . . . look over your prospective customers . . . "Size 'em Up" . . . build a good prospect list . . . get dryers out on demonstration . . . get a broad base on which to build a successful 1950 record.

Coordinated with the water heater and clothes dryer promotion will be your AGA national advertising—running in February, March and April and featuring the slogan "For Hot Water Magic—Gas Has Got It!" Material for this campaign is to be distributed to you by Dec. 15. We've got a story that can't be beat in water heating. Use it!

The *April, May* and *June* "Spring Style Show" is to be our first range campaign of the new year. We're going after the replacement and new home market simultaneously. The campaign will be built around the idea that spring is here when thoughts turn to buying new homes, new cars, new clothes, or renovating present homes and purchasing new equipment. Full details for this activity will be coming your way around Feb. 15. AGA national advertising will start building up for this promotion in March and will continue during April, May and June in our full list of publications.

During *July, August* and *September* we will run two parallel campaigns . . . a house heating and air conditioning campaign with incinerators included, and a bang-up refrigerator campaign. The objectives of the house heating and air conditioning campaign will be threefold:

1. To check all our house heating installations to make sure none is creating bad customer relations.
2. To sell present owners of old gas house heating equipment new installations or to supplement gas house heating with summer air conditioning.
3. If you're ready to take on extra load, this will be the peak time to make a drive for new customers. This campaign is well timed since it precedes the normal house heating season and comes immediately after the normal air conditioning season so that in either case your period of activity can be lengthened to your profit. Incinerators because they are usually installed in the basement will be given a push during this period because this long-neglected appliance presents good load building possibilities.

The gas refrigeration campaign is scheduled, too, for July, August, and September. This will, in a sense, carry on the peak most companies reach in May and June. It will be called a "Clean Sweep" campaign because it is designed to spark a final drive on good prospects who have not yet bought and it comes during Servel's final sales period before the prize winners will be announced for Servel's October prize trip. AGA advertising will tie in with the refrigeration drive in June and July.

In *September, October* and *November* we'll feature the annual "Old Stove Round Up." We're going to make this an annual event. We'll start earlier this year with the plan book to be sent out during early July for those who want to get an early start. The advertising will start late in August and continue through September, October and November.

December is holiday gift promotion month. No special campaign will run in connection with this activity but it is the time of the year when every manufacturer offers his complete line to prospects for Christmas giving. Our national advertising will stress the Christmas gift theme and your own local tie-in can well capitalize on this advertising.

LADIES' DAY IN AGA

Workshop first event on 1950 calendar

Under the leadership of Irene L. Muntz, director of home service for Rochester (N.Y.) Gas & Electric Corp. and newly appointed chairman of the AGA home service committee, the annual Home Service Workshop will convene Jan. 4-6 at the Palmer House in Chicago.

Irene Muntz

This being the month the feminine contingent of the gas industry has its opportunity to shine, Miss Muntz's program committee has lined up a complete and intensive program for the three-day session. In addition to the many speakers on workshop topics, prominent gasmen who will talk include F. X. Mettenet, Peoples Gas Light & Coke Co., Chicago; H. Preston Morehouse, Public Service Electric & Gas Co., Newark, and chairman of the residential gas section for 1949-50; R. E. Ginna, Rochester; H. Vinton Potter, AGA; and E. Carl Sorby of Roper.

Two new motion pictures will have their premiere—"Gas for Home and Industry," produced by Encyclopedia Brittanica, and "New Freedom in Her Modern Gas Kitchen."

Miss Muntz, whose appointment was announced late in November by Mr. Morehouse, has served as home service director of the Rochester system since 1942.

Planning the Home Service Workshop are these members of the AGA home service committee (clockwise, from left) : Ella A. Heyne, Northampton, Mass.; Pauline Treisch, Tappan; Flora G. Dowler, Pittsburgh; Kathryn A. Heffernen, Green Bay; Jane Schleicher, Cleveland; Elizabeth J. Lynahan, Chicago; Mary Apt, Mission, Kan.; Irene Muntz; Jessie McQueen, AGA; Kathryn O. Johnson, Spring Valley, N. Y.; Martha Carnes, Servel; Julia Hunter, Dallas; Florence J. Neely, Baltimore; Mary E. Huck, Columbus; Mary N. Hall, Elizabethtown, N. J.; Thelma Hunter, New Bedford, Mass.; Ruth Soule, Brooklyn; Eleanor V. Wiese, Newark.

PERSONAL ATTENTION TO EMPLOYEES URGED

Wolf's talk keynotes personnel conference; pension, fringe benefit costs aired

The $40,000 which the gas company has invested in every employee makes him a veritable small business man with a responsibility for producing a return on this heavy investment, AGA Managing Director H. Carl Wolf declared in a keynote address at the fourth annual national gas industry personnel conference held at the Netherland Plaza hotel, Cincinnati, Nov. 28-29.

H. Carl Wolf

Such employees cannot be cogs in an assembly line, he told the 100 personnel and employee relations executives in attendance. They must be carefully selected, adequately trained, responsibly supervised, and integrated into the company program.

The field of pensions and fringe benefits came in for prominent discussion on the program. Eskil I. Bjork, vice president of Peoples Gas Light & Coke Co., Chicago, imparted some of his extensive knowledge on pension matters at the first afternoon session of the conference. V. H. Luneborg, Arkansas Natural Gas Corp., chairman of the employee relations section of the Southern Gas Assn., reported some of the more important conclusions drawn from the 1949 survey of fringe benefit costs.

The importance of absenteeism was pointed out by D. S. Sargent, personnel director of Consolidated Edison Co. of New York, who reported that sick absence in 1948 cost ConEd approximately $2.1 million for 172,000 man-days. This amounted to 2.1% of the total payroll. Mr. Sargent's talk was part of a symposium on the subject participated in by L. M. Ayers, Peoples Natural Gas Co., Pittsburgh, and A. W. Isenhart, Dayton (Ohio) Power & Light Co.

Other important speakers and their topics included Dr. Robert K. Burns, University of Chicago, who reviewed the elements in supervisory development; W. C. Beckjord, Cincinnati Gas & Electric Co., who stressed the importance of a good industrial relations program; Dr. Daniel Katz, University of Michigan, who reported developments in methods of studying human relations; and Dr. Jay L. Otis, Western Reserve University, who talked on testing and job evaluation.

Hotel Show's Success Points to Big Commercial Sales Year

Commercial gas appliances played to a record house Nov. 7-11 when the 1949 National Hotel Exposition was held at the Grand Central Palace, New York. Attendance topped 132,000 at the show, at which the combined AGA exhibit was one of the feature attractions.

The overwhelming interest shown at the affair was interpreted as a favorable sign for business in 1950.

At a meeting of the AGA food service committtee held in conjunction with the show, members voted enthusiastically to stage a national sales campaign on heavy duty cooking equipment next fall. This campaign will follow along the lines of the Old Stove Roundup.

E. V. Fineran, Washington Gas Light Co., chairman of the committee, presided.

Another sidelight of the exhibit was the second annual Commercial Gas Breakfast sponsored by the industrial and commercial gas section of the AGA. Guest speaker was Donald B. Gridley of the Patterson Publishing Co., publisher of *American Restaurant* magazine and *American Hotel* magazine.

Lee Succeeds Macomber in GAMA

J. R. Lee

With the retirement of Leonard Macomber, effective Jan. 1, James R. Lee has been appointed Washington representative for GAMA. Simultaneously, Managing Director H. Leigh Whitelaw announced that Washington activities will be expanded.

For more than 20 years Mr. Lee has been identified with private and government public relations activities in Washington and in Memphis, Tenn. During the war he was in charge of federal public housing public relations contacts in the capital. He also served as promotion editor for Scripps-Howard newspapers.

Mr. Macomber will soon take up new duties as a manufacturers' consultant in Washington.

WISCONSIN PROGRESS

Conference delegates hear big conversion plans

Widespread conversions to natural gas throughout large areas in the state and a tremendous new electrical construction program helped to whip up interest in the Wisconsin Utilities Assn. meeting at the Schroeder hotel in Milwaukee, Nov. 21-23. The result was a new attendance record, with nearly 600 gas and electric company delegates turning out to hear the many authoritative addresses presented at the conference.

Indicative of the new construction which is currently under way in the state was the report by association president Carl A. Altenbern that eight gas companies are spending more than $14 million in 1949 and 1950 for conversion to natural gas.

Divisional chairmen and vice chairmen for both the gas and electric sections were named at the convention. Heading the list are Gilbert G. Ellerbrock, Oshkosh, chairman of the gas technical division, and J. C. Bollender, Milwaukee, vice chairman; E. P. Mink, Delavan, chairman of the gas division's sales and service section, and A. G. Bur, Green Bay, vice chairman.

E. P. Mink

G. G. Ellerbrook

Mr. Altenbern, in his president's address, made a strong plea for action to prevent socialization of the industry. Another top speaker at the general sessions was John C. Doerfer, chairman of the state public utilities commission, who spoke on regulatory matters. He stressed, particularly, the tendency of the federal government to encroach upon state jurisdiction and gave some expert advice on how operating companies recently divorced from holding companies might obtain technical service.

In the technical division of the gas section outstanding speakers included P. L. Covell, Minneapolis Gas Co., who spoke on his company's experiences in gas odorization; J. C. Bollender, Milwaukee, who described his firm's changeover; G. T. Bentley, Michigan Consolidated Gas Co., who spoke on high-Btu oil gas; and Walter K. Paul, Northern Indiana Public Service Co., Hammond, who presented a motion picture on his company's employee training center.

Fuel Appraisal Conference

Anticipating the availability in the near future of all four major fuels—coal, oil, natural gas, and electricity—the department of mechanical engineering, University of Tennessee, is sponsoring a combustion conference Jan. 26-27 on the campus at Knoxville. The two-day session is intended to help industry in the area decide which fuel is most suited to its purposes.

The gas story will be told by F. O. Hess, president, Selas Corp., Philadelphia; W. M. Hepburn, vice president, Surface Combustion Corp., Toledo; and Col. W. F. Rockwell, Rockwell Manufacturing Co., Pittsburgh. A. C. Wenzel, Republic Flow Meter Co., Chicago, is also scheduled to speak, his subject being "Combustion Controls."

Rocky Mountain Assn. Chooses Neely

S. J. Neely, manager of North Denver Furniture Co., was elected president of the Rocky Mountain Gas Assn. at its annual meeting in Denver Dec. 12. Mr. Neely represents the retail stores branch of the association.

New officers pictured in the above photo are (back row, from left): Roy G. Munroe, Public Service Co. of Colorado, Denver, secretary-treasurer; Paul W. Young and Ben C. Heald, directors; (front row, from left): Dick Tanner, vice president; Mr. Neely; and D. A. Bell, vice president.

Not shown is G. M. Musick, a director. All the officers except Mr. Munroe are representatives of manufacturers, architects, and dealers.

PCGA Sets Schedules For Section Conferences

A schedule of section meetings for the coming year was recently announced by the Pacific Coast Gas Assn. Five meetings of the technical section are now planned. These include:

Accident Prevention—Feb. 16-17, Santa Barbara, E. E. Taylor, Southern California Gas Co., sponsor.

Technical Services—March 8-9, San Diego, N. K. Senatoroff, Southern Counties Gas Co., sponsor.

Automotive Equipment—April 5-6, Berkeley, J. R. Rensch, Coast Counties Gas & Electric Co., sponsor.

Distribution—April 27-28, Fresno, E. F. Sibley, Pacific Gas & Electric Co., sponsor.

Transmission—May 25-26, San Luis Obispo, C. F. Briscoe, Southern Counties, sponsor.

The accounting section, which held its first meeting Dec. 8-9 in San Diego on the subject of payrolls, has scheduled these additonal meetings:

Job Training and Manuals of Accounting Procedure—March 23-24, Los Angeles, L. P. Derrick, SoCal, sponsor.

Purchasing and Contract Negotiations—April 20-21, San Francisco, George Coughlan, PG&E, sponsor.

General Accounting—May 18-19, Santa Cruz, Dexter Stoner, Coast Counties, sponsor.

AGA Notes . . .

The American Gas Assn. Laboratories—a broader, less restrictive title which better describes their functions—became the new name of the American Gas Assn. Testing Laboratories on Jan. 1. The change, ordered by the AGA executive board at a recent meeting, noted the expansion of the laboratories' functions to include research under the five-year PAR plan. . . The American Gas Assn., which is returning to Atlantic City, N. J., for its 1950 convention, will head west to St. Louis in 1951, the time and place committee has announced. Dates set are Oct. 15-18. George E. Whitwell, vice president, Philadelphia Electric Co., heads the committee whose recommendations were approved by the executive board in a recent meeting. . . H. Carl Wolf, managing director of the American Gas Assn., is one of 12 authorities on fire prevention and control who have accepted appointment to the board of counsellors for the Fire Technology Division of Southwest Research Institute of Houston and San Antonio. Dr. Harold Vagtborg, institute president, has announced. The purpose of the division is to work toward reducing the toll of human lives and property loss from fire.

CALENDAR

JANUARY

AGA Home Service Workshop—Palmer House, Chicago, Jan. 4-6.

Southwest Air Conditioning Exposition—State Fair Grounds, Dallas, Jan. 23-27.

American Society of Heating & Ventilating Engineers Annual Meeting—Dallas, Jan. 23-27.

MARCH

New England Gas Assn.—Hotel Statler, Boston, March 23-24.

Southern Gas Assn.—Galveston, March 27-29.

The Maryland Utilities Assn.—Lord Baltimore Hotel, Baltimore, Md., March 31.

APRIL

AGA Distribution Motor Vehicle and Corrosion Conference — Book Cadillac hotel, Detroit, April 3-5.

AGA Sales Conference of Industrial and Commercial Gas Section—St. Louis, April 4-6.

Mid-West Gas Assn.—Hotel Lowry, St. Paul, April 10-12.

Southwestern Gas Measurement Short Course—University of Oklahoma, Norman, April 11-13.

National Petroleum Assn.—Hotel Cleveland, Cleveland, April 12-14.

National Conference of Electric and Gas Utility Accountants—Brown hotel, Louisville, April 17-19.

Florida - Georgia Gas Assn. 1950 Business Conference—Biltmore hotel, Palm Beach, April 20-22.

Indiana Gas Assn. — French Lick Springs hotel, French Lick, Ind., April 28-29.

MAY

AGA Commercial Gas School—Hotel Gibson, Cincinnati, May 1-5.

AGA Natural Gas Department Spring Meeting—Mayo hotel, Tulsa, May 8-9.

Pennsylvania Gas Assn.—Galen Hall, Wernersville, Pa., May 16-18.

AGA Gas Production and Chemical Conference—Hotel New Yorker, New York, May 22-24.

National Restaurant Assn.—Navy Pier, Chicago, May 23-26.

The Natural Gas and Petroleum Assn. of Canada—Prince Edward hotel, Windsor, Ont., March 25-26.

Gas Appliance Manufacturers Assn. Annual Meeting—The Greenbrier, White Sulphur Springs, W. Va., May 28-30.

JUNE

Edison Electric Institute Annual Convention—Atlantic City, N. J., June 5-9.

Canadian Gas Assn. Annual Convention—Manoir Richelieu hotel, Murray Bay, Quebec, June 19-24.

EXPANSION

NEW PLANT FOR HAWAII

Refinery, LP-Gas marketing firm established

The Honolulu Gas Co., Ltd. (Territory of Hawaii) has assisted in the formation of Pacific Refiners, Ltd., a new company, organized to provide the territory with certain commodities presently imported from the mainland of the United States at considerable expense. This new company is expected to strengthen the position of the Honolulu Gas Co. in two major ways:

1. To provide the gas manufacturing plant with an uncracked stock of high hydrogen content, and

2. To launch a liquefied petroleum gas system which will assure that present beyond-the-mains customers will be using gas at such time as they are no longer beyond the mains.

In addition to the production of gas-oil and butane the new company will supply asphalt, which has a ready market in the territory and, incidentally, other light fractions including insecticide oils. It is expected that Pacific Refiners will be ready for full scale operation by this summer.

The net results of Honolulu's program will be a highly competitive LP-Gas distribution system which will actively solicit new customers; and a higher-grade, more efficient oil—one tailored to the wants of the gas-making machinery—from an independent source and at a relatively low price.

The operations of Pacific Refiners, Ltd. will thus stretch from the production of LP-Gas (as well as other hydrocarbons) to the marketing of appliances that will burn it. Electricity, which has had the field pretty much to itself, will find the market becoming highly competitive in short order. Up to now, Standard Oil Co. of California, which distributes the bulk of liquefied petroleum gas in the islands, has never actively pushed sales. Coming from the West Coast, the gas had been so priced as to give electricity a substantial advantage.

Pacific Refiners will also step into the appliance marketing picture in the area served by mains, taking over the sales of equipment burning utility gas.

The establishment of Pacific Refiners, Ltd., enables the direct purchase of heavy California crude which will substitute for the Western bunker fuel oil presently purchased from refineries on the Pacific Coast.

Up to the fall of 1948, Hawaii was buying Pacific specification 400, but at that time a new grade was created which, although it was less expensive, was more extensively stripped of hydrocarbons. The by-product yields have been aromatic tar and lampblack, which have been put to work as boiler fuel.

By assisting in the formation of this new company Honolulu Gas Co. has taken another step in the major move toward modernization and expansion. Shortly after the war the company contracted with Ebasco Services to modify its plant, which was originally designed by Leon Jones, and the remodeling was completed two years ago. The process in use at the time was similar to those in use at West Coast oil-gas plants, but after the changes were made exhaust heat losses were radically shaved. Exhaust gas stack temperature of 1600° F was reduced to 550° F. This reduction in temperature, coupled with the reduction in requirements due to pre-heating the combustion air, reduces heat losses to less than 20% of former figures.

High efficiency was obtained by making all generators automatically and electrically controlled.

Why the company, which serves a 515-Btu gas, did not change over to high-Btu oil gas when it instituted the plant modifications may furnish insight into the character of its operations. As Vice President and General Manager A. E. Englebright points out, the chief advantages of high-Btu processes are twofold—to increase distribution capacity and to serve as supplement for natural gas. Natural gas, of course, is not available on the islands nor is there good prospect that it will be; and an increase in distribution capacity is not needed.

Furthermore, high-Btu processes, whose most advantageous application is the conversion of water gas sets, yield a high content of low-quality tar while Honolulu's plant yields a small quantity of high-quality tar.

Hawaii has no peak load problems because there is practically no market for house heating in Hawaii's balmy, even-temperature climate. Less than 5% of the residences have fireplaces; and the utility's load factor exceeds 90%.

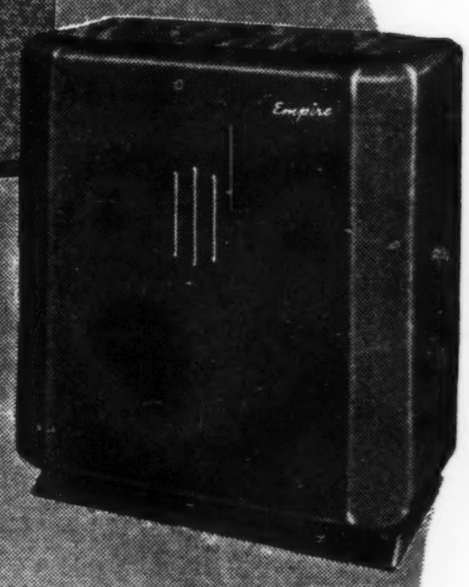
JOHN A. FRY (at right), president of Detroit Michigan Stove Co., is shown receiving the merit award of the American Society of Industrial Engineers for outstanding contributions to productive arts and sciences in its field. Ivan N. Cuthbert, chairman of the awarding committee of ASIE, makes the presentation. Mr. Fry's company, maker of Detroit Jewel and Garland ranges, is the only range manufacturer to be honored by the society.

Watch . . . EMPIRE in '50!

THE LEADER FOR *gas*

The Economical EMPIRE "LO-BOY" Gas Floor Furnace.

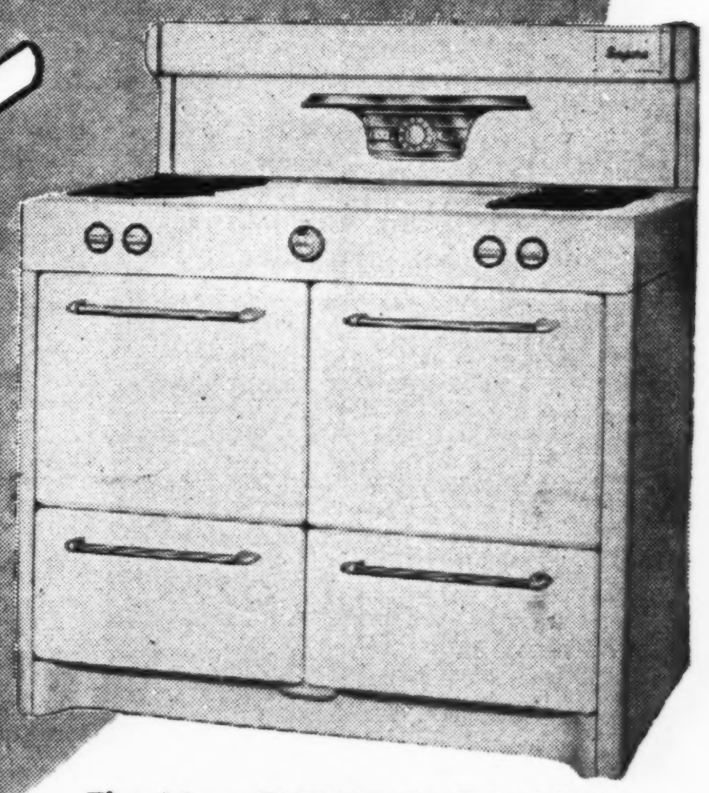
The Famous EMPIRE DE-LUXE Gas Floor Furnace.



The Streamlined EMPIRE Gas Circulator Heater.

Coming!

Watch for the new EMPIRE Gas Appliances to be announced soon.



The New EMPIRE GAS RANGE.

THE PROFIT LINE IN ANY YEAR!

EMPIRE production lines are now producing Gas Floor Furnaces with 'Thriftmatic' Burners and other gas appliances in the greatest volume in EMPIRE history. It's the profit line for you in '50 or any other year. EMPIRE Gas Appliances meet all competition. Sell the line that's first in customer acceptance—EMPIRE!

See The EMPIRE Representative in Your Territory or Write Us Direct

EMPIRE STOVE CO., BELLEVILLE, ILLINOIS

MANUFACTURERS OF GAS HEATING AND COOKING APPLIANCES

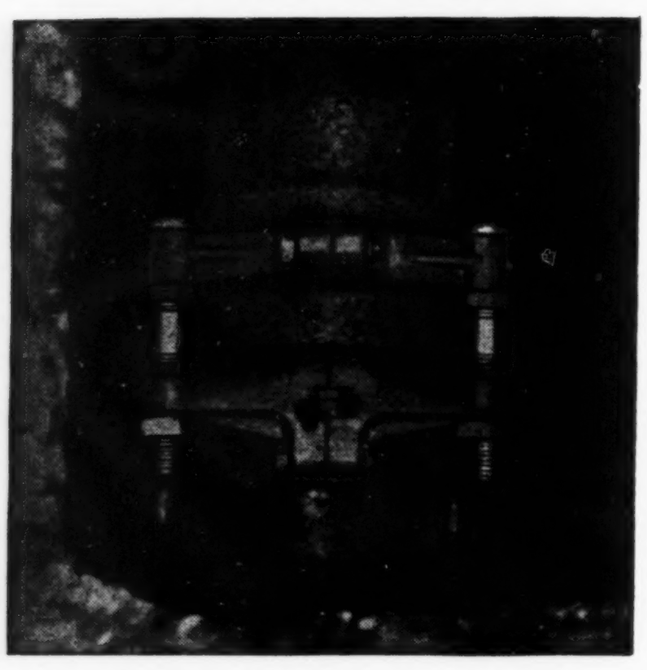
A SIMPLE SOLUTION for one of the GAS INDUSTRY'S *most trying problems*

the **NORMAC**

BELL JOINT CLAMP

SOLVES YOUR JOINT REPAIR PROBLEMS

6 inch Normac Clamp being lowered into hole for installation



6 inch Normac Clamp in service after installation

QUICK • EASY • PERMANENT

Installed in small pavement openings. Available in all standard sizes from 3" to 12". A simple set of tools cleans the joint, installs the clamp . . . often in only a quarter of an hour. SAVES TIME. SAVES MONEY and the repair is permanent. Designed for all conditions particularly where pavement repair costs are prohibitive. Such small opening repairs are scarcely noticeable when pavement is replaced.

Normac Clamps can be installed in large as well as small openings.

Norton - McMurray hold definite leadership in the development of methods for installation and rehabilitation work through small openings. We welcome the opportunity to help solve a problem you may have—tell us about it.

Write for our catalog describing our complete line of COUPLINGS . . . FITTINGS . . . SERVICE TEES and ELLS . . . SLEEVES . . . COMPRESSION-END COCKS . . . METER BARS and BRASS FITTINGS for copper pipe.

NORTON-McMURRAY MFG. CO.

39 SOUTH LA SALLE ST. • CHICAGO 3, ILL.

Method and product covered by U. S. Patents, Nos. 2,163,261 and 2,178,286.

TEX ANTOINE (at left), narrator, cartoonist, and humorist who is doing a five-minute, five day a week television show for Consolidated Edison Co. of New York, points out some of the features of the next day's weather to George T. Minasian of ConEd at a pre-telecast. Commercials are done by Tex in cartoon style for the 6:55 p.m. show.

Boiler Business Booming

Gas boiler sales in the Pennsylvania, New Jersey, and New York regions are booming, according to G. E. DeSiena, vice president, Superior Combustion Industries Inc., New York.

Mr. DeSiena recently told the New York *Times* that the arrival of natural gas is having impressive effects upon sales of gas-fired equipment throughout these states. He pointed to a virtual "revolution in combustion" in New York City made possible by natural gas, together with new boiler design which makes interchangeability of gas and fuel oil rapid and easy.

Motorola Builds in Phoenix

Plans for erection of a new research library and specialized production building in Phoenix were revealed last month by Paul L. Galvin, president and founder of Motorola Inc., Chicago. The building will supplement the space now occupied by the company in Phoenix.

A 40,000-sq ft single story structure, it will be ready for occupancy on March 1.

The communications and electronics division will operate the laboratory. According to Mr. Galvin, the Phoenix site was selected in conformance with the general request of the Munitions Board that key industrial facilities important to defense and war production be dispersed.

25,000 Heaters in St. Louis

Laclede Gas Light Co., St. Louis, added 25,000 new house heating customers in the fiscal year ending Sept. 30, according to an annual report recently issued by President Robert W. Otto. This effort doubled the company's house heating load. It was made possible through conversion to straight natural gas which was scheduled to be completed last month.

REGULATION

New Winter Curtailment Plan Established for Panhandle

For the fourth straight winter, the FPC last month set up emergency service rules covering deliveries by Panhandle Eastern Pipe Line Co., designed to provide an "orderly curtailment" of service when demands of customers exceed the system capacity.

The rules, which became effective Dec. 9 and will continue in force until May 1, affect customers in Texas, Kansas, Missouri, Illinois, Indiana, Ohio, and Michigan.

Panhandle's present capacity of 500 MMcf will be approximately 50 MMcf short of customers' estimated peak day firm service requirements. Over and above this, there are the interruptible service requirements of approximately 78 MMcf.

Rejecting Panhandle's proposed curtailment plan incorporated in a tariff submitted last June on the basis that it was "unjust, unreasonable, unduly discriminatory, and preferential," the FPC promulgated its own schedule using as a starting point last winter's calculated daily requirements of customers at 0° F. On top of this, adjustments were made to reflect the growth of non-heating domestic and commercial consumption.

New York Companies Granted Rehearing on Jurisdiction

Consolidated Edison Co. of New York Inc., Brooklyn Union Gas Co., and Kings County Lighting Co. will soon have another opportunity to clear themselves of federal jurisdiction as a result of the FPC's action last month in granting petitions for rehearing of the case.

The companies' petitions, filed together with a request by the state public service commission, sought abrogation of the FPC's findings in its Oct. 31 order. The order in question, while authorizing the construction of natural gas pipeline facilities in the New York metropolitan area, which would receive gas from Transcontinental Gas Pipe Line Corp.'s Texas-to-New York line, was felt by the companies to be unfavorable in that it established FPC jurisdiction.

Panhandle Tariff Case Delayed

The hearing that was scheduled to be held Dec. 12 by the Federal Power Commission, a proceeding involving Panhandle Eastern Pipe Line Co.'s (Kansas City) natural gas tariff, was postponed indefinitely last month.

The postponement was made to permit filing of responses to a motion of the Illinois Commerce Commission asking a 120-day recess. The Illinois commission in its motion pointed out that Trunkline Gas Supply Co. now has an application pending before the FPC proposing construction of facilities to carry 250 MMcf per day to Panhandle, which would increase Panhandle's present deliveries by 50%.

The additional supplies would directly affect the setting up of the proposed natural gas tariff which was suspended by commission order several months ago.

May we assist you, sir?

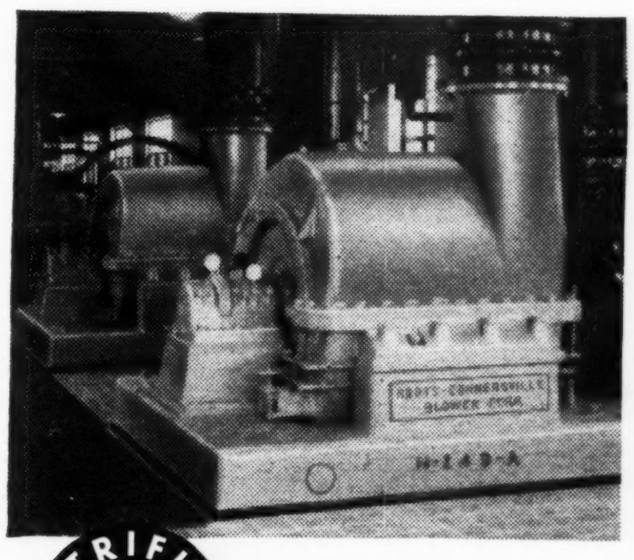
If you're on a merry-go-round about handling air or gas, *R-C dual-ability* can help you.

That's been our exclusive job for almost a century. We've developed the most extensive line of blowers, exhausters and gas pumps in the industry, with capacities from 5 cfm to 100,000 cfm.

We're the only builders offering that *dual choice* of both Centrifugal and Rotary Positive equipment. Thus, without bias, we can suggest units that meet most closely the requirements of the work to be done.

For new installations or replacements, look to us for your needs. Alert engineering teams up with modern construction to insure long-time, satisfactory performance of R-C equipment.

ROOTS-CONNERSVILLE BLOWER CORPORATION
501 Oregon Avenue, Connersville, Indiana

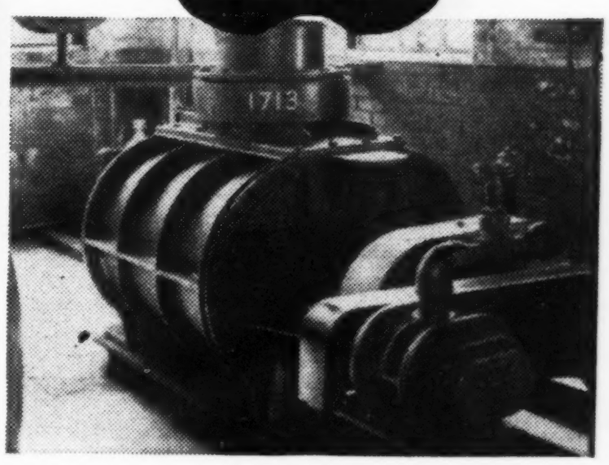


CENTRIFUGAL

Two Type H, 4-stage Centrifugal Gas Compressors, capacity 12,500 cfm each, in gas plant service. Driven by steam turbine.

This R-C Rotary Positive Exhauster has been in gas plant operation since 1926. Driven by variable-speed steam engine. Capacity 1,500,000 cfh of coal gas.

ROTARY



ROOTS-CONNERSVILLE

BLOWER BUILDERS R-C SINCE 1854

ONE OF THE DRESSER INDUSTRIES

Regulatory Notes

Mon C. Wallgren, who was sworn in as a Federal Power Commissioner last month, was unanimously elected vice chairman of the commission to serve during 1950. He succeeds Claude L. Draper, who served during 1949. . . Atlantic Seaboard Corp.'s proposed gas tariff was suspended late in November by the FPC, pending hearing and decision. The hearing is scheduled to commence Jan. 11 in Washington on the lawfulness of the changes proposed to be effected. Washington Gas Light Co. and Washington Gas Light Co. of Maryland Inc. had filed protests against certain changes embodied in the tariffs. The new tariff was to have become effective last Dec. 1, according to Atlantic Seaboard plans. . . Colorado Interstate Gas Co.'s motion for a modification or stay of the FPC order of Nov. 2 regarding changes in the company's proposed natural gas tariff has been denied by the commission. Because of the time element, the company had held that it would be required to comply with the commission's decision before it had an opportunity to seek a court review. The company wanted an extra 120 days in which to file the new schedule as required.

Cut Gas Heater Costs...Boost Sales

This ONE GASAPACK REPLACES ALL THESE UNITS

(Pressure regulator, solenoid, pilot filter, A-cock, B-cock, piping.)

THIS dependable "One-Does-All" GASAPACK beats anything you've seen for fast time-saving factory assembly! Just tighten *two screws* on a bracket and you have *complete* Gas Control for your circulating heater or furnace. Even the burner spud is built-in. It's a "One Does All" control that effectively replaces pressure regulator, solenoid, filter, gas cocks and all piping . . . and assures easy installation and *complete satisfaction* in the field!

DON'T WAIT! Check GASAPACK Today — for your own profit! Write for complete details.

You get all these features in new GASAPACK Model 54:

• 100% Fail Safe Operation • 100% Safe Lighting • 100% Shut-Off Safety • 100% Automatic Convenience — with Thermostat, Electric Top, Transformer • Only ONE Unit to Buy, Stock, Install • BUILT-IN Pressure Regulator, Pilot Filter, Safety Shut-Off, Automatic Pilot, Burner Spud • Compact Size—Only 5½"x5½" x 3⅞" • Wide Capacity —70,000 B.T.U. (Gases less than 800 B.T.U. per cu. ft.) 100,800 B.T.U. (Gases more than 800 B.T.U. per cu. ft.)

AUTOMATIC PRODUCTS COMPANY

2526 North Thirty-second Street, Milwaukee 10, Wisconsin

DEPENDABLE Controls

Known by MILLIONS for Performance in Heating . . . Air Conditioning . . . Refrigeration

FINANCIAL

Jacksonville Utility Loses Year-Long Rate Fight

A year-long court battle was resolved Dec. 2 when the Florida Railroad & Public Utilities Commission ruled that Jacksonville Gas Corp. would have to cut back its rates and refund $150,000 collected from customers during the past year. In the order the commission allowed the company to earn 7% profits on its rate base, less than half of the amount the company had asked for.

The controversy between the gas company and the city commission started early in 1948 after an increase in rates described by the commission as "arbitrary and unreasonable" had been effected. In October of that year the city commission ordered a 10% reduction, but the gas company obtained a federal court injunction pending appeal. When the utility attempted to bring the suit to federal court, it was referred to the state commission.

The new rates are retroactive to Jan. 1, 1949.

FPC Denies Hope's Appeal Of Rate Suspension Order

A motion filed by Hope Natural Gas Co., Clarksburg, W. Va., requesting that the FPC modify its order of Oct. 31, 1949, which suspended Hope's proposed tariff changes, has been denied. The suspension order affected proposals which would have increased Hope's rates for natural gas service by approximately $1.9 million annually. *(GAS,* Dec., page 62.)

Hope asked that the proposed rate increase be permitted to become effective as of Nov. 1, proposing that it would agree to terms to be prescribed by the commission assuring a refund to Hope's customers of all amounts in excess of the rates ultimately fixed.

Gas Sales Snowballing

Up and up continues the trend in gas sales by utilities and by pipeline companies, according to recent reports of the AGA and the FPC. Total revenues from sales of gas by utilities for the third quarter of 1949 amounted to $297 million, an increase of 5% over the third quarter of 1948.

Revenues from commercial sales led the parade with a 12.2% gain, while residential gas revenues were up 5% and industrial revenues showed an increase of 2.7%. For the 12 months ending Sept. 30 total revenues were $1,630,000, an increase of 8.7% over the previous 12-month period.

Natural gas companies meanwhile registered an 11.7% increase for September with a total operating revenue of $65.8 million, FPC said.

A supplementary report issued by the AGA showed October registering a 12% increase over October 1948, with a 12-month increase of 9.2%. The association's index of gas sales for the month was 228.0% of the 1935-39 average. Natural gas sales were up 13.7%.

Gainesville in Receivership

The Gainesville (Fla.) Gas Co. went into the hands of a receiver Nov. 22. By federal court order, Clarence B. Reinschmidt, vice president of South Atlantic Gas Co., took over control of the plant operation.

Action which culminated in the declaration of receivership was initiated by the American Meter Co., Philadelphia. Total liabilities were listed at nearly half a million dollars, the company having operated at a loss for the past three years.

Former management was headed by President W. H. Rogers and I. I. Wynn, manager.

Financial Notes

A consolidation and dissolution plan involving Niagara Hudson Power Corp., Syracuse, and its subsidiaries, Buffalo Niagara Electric Corp., Central New York Power Corp., and New York Power & Light Corp. becomes effective Jan. 5. By order of the state public service commission and the Securities & Exchange Commission and approved by the U. S. District Court, Niagara Hudson was dissolved and the other three companies were consolidated into a single operating company. Temporary name of the new company is Niagara Mohawk Corp. . . Transfer of the Huntsville, Ala., gas distributing properties from the Alabama Gas Co. to the city of Huntsville was scheduled to be completed by Dec. 31. The price paid, according to an agreement made Dec. 1, was $39,000. . . Temporary increases in electric, gas, and steam rates which the Public Service Commission of Maryland had previously approved for Consolidated Gas Electric Light & Power Co. of Baltimore became permanent under an order issued Nov. 29. The increases, which were first set up in May 1949, will produce a rate return between 5½ and 6%. . . An interim rate schedule filed by Michigan-Wisconsin Pipe Line Co. will remain in effect until Jan. 2 by authorization of a modification early last month of a previous FPC order. The company must file a tariff that will satisfy the FPC by that date. The schedule covers natural gas service through facilities authorized by the commission last August.

MISCELLANY

Koppers Offers Packaged Aid

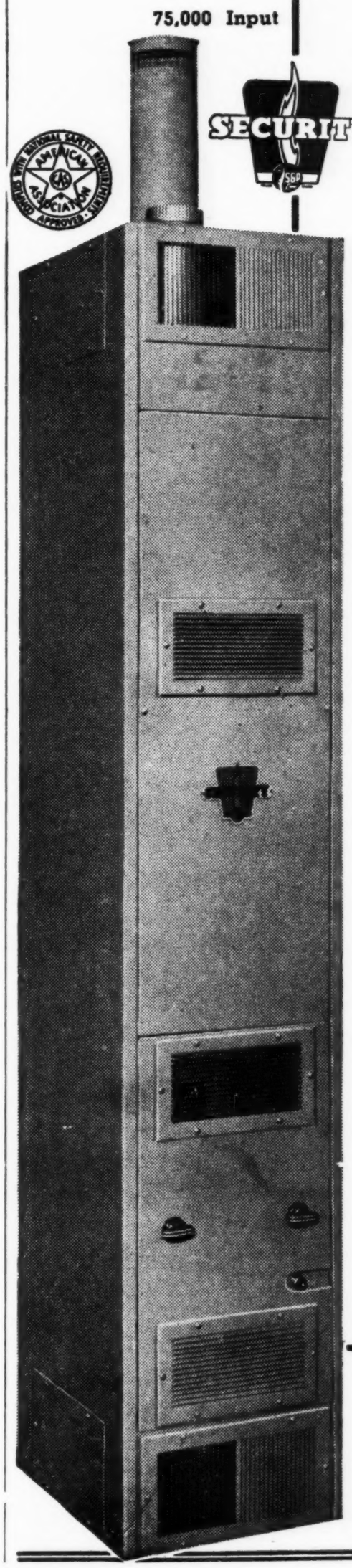
A completely packaged service to the gas industry has recently been instituted by Koppers Co. Inc., Pittsburgh, offering consultation, design, manufacturing, construction, and maintenance service.

Koppers' services for the industry now are coordinated under a new gas department of the company's engineering and construction division, headed by Joseph Becker, vice president. Manager of the gas department is J. Hawley Taussig Jr., formerly an assistant engineer of works for the Philadelphia Gas Works Co.

The new organization, according to Brehon Somervell, Koppers president, is set up to provide aid to utilities in modernizing, expanding, and operating their facilities.

Miscellaneous

The first gas-operated refrigerators to be manufactured in Canada will be coming off assembly lines of Canadian Assemblies Ltd. at Amherst, Nova Scotia, early in 1950. This new refrigerator is being built for Servel (Canada) Ltd. Previously, all gas refrigerators had been imported from the U.S... Pennsylvania gas companies now will be required to test domestic meters only once every eight years as a result of a public utility commission order issued last month. The period was extended from five to eight years on all meters recording under 250 cu ft per hour. . . Savannah (Ga.) Gas Co. last month celebrated the beginning of its 102nd year of service to the city with a banquet and dance in honor of its employees... South Carolina Power Co., Charleston, last month launched a "safety through knowledge" drive for all its employees with the distribution of a booklet on safe driving. The booklet, which covers the new state traffic code, was presented at the annual dinner given by the employees of the gas plant. . . The Petroleum Educational Institute, 704 S. Spring St., Los Angeles, announces that its course in petroleum chemistry and refining for salesmen is now available under the GI Bill. . . A four-week course in cathodic protection which it claims is the first of its kind for non-technical personnel was held last summer by the Oklahoma Natural Gas Co., Tulsa, the company has revealed.



NOW...

a TRULY Forced Air

INN-A-WALL

...and you can employ duct work where necessary!

YES, sir . . . here is *the* answer to heating properly small homes without basements. Security's INN-A-WALL is an entirely new principle in forced air heating! Requires minimum duct work . . . may be used without ducts. Needs only 16 by 20-inch floor area.

The INN-A-WALL reverses the usual flow pattern . . . warm air comes out the *bottom*. This means *warm floors!* Warm air can be taken from all four sides . . . return air, from all sides at the top. Where ducts are required for distant rooms, permanent connection is made at the bottom. Completely assembled . . . ready to install. Casing height, 88 inches. Security breather tube automatically supplies air for combustion.

Other outstanding INN-A-WALL values are • Quiet positive blower • Fully automatic • Special Security high-efficiency burners • Complete adaptability to any floor plan • Amazingly economical in price.

SECURITY

Automatic, Gas-Fired

INN-A-WALL FURNACE

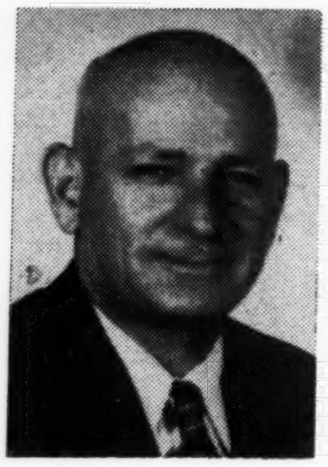
Write Today . . . don't delay. Get all the facts about this revolutionary new furnace.

SECURITY MANUFACTURING CO.

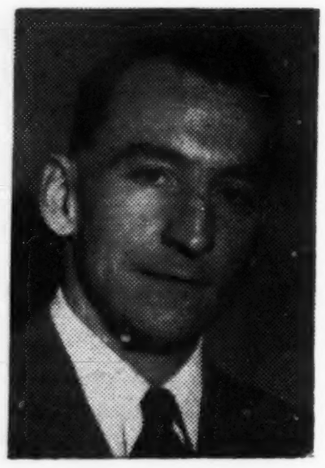
1630 OAKLAND STREET • KANSAS CITY 3, MISSOURI

PEOPLE

Karl Emmerling
. . . East Ohio



Henry Pitman
. . . Empire



A. N. Zahniser
. . . Dresser Mfg.

R. V. Burnette
. . . Rockwell Mfg.

KARL EMMERLING, 38-year employee of East Ohio Gas Co., Cleveland, retired Nov. 1. In 1934 Mr. Emmerling was named assistant general superintendent of the company. He had been general sales manager since 1941 and a director since 1944. Earlier in his career with the Ohio utility, he served as gas works superintendent, Akron plant engineer, and head of the industrial gas department. Mr. Emmerling is a past chairman of the AGA industrial and commercial gas section and has served on a number of AGA committees. He has been succeeded as general sales manager by THOMAS J. NOONAN. JOHN C. DORSEY is assistant general sales manager.

HENRY H. PITMAN has been appointed regional manager of Empire Stove Co.'s (Belleville, Ill.) Dallas and Houston territories. Mr. Pitman was formerly Texas representative for the Payne Furnace Co. He is headquartering in the Koon McNatt Bldg., Dallas.

A. NEWTON ZAHNISER is the new northeastern representative for Dresser Manufacturing Division, Bradford, Pa. Mr. Zahniser will call on gas customers in New England, eastern New York, and eastern Pennsylvania. Before joining Dresser, he was associated with the Wailes-Dove Division of Koppers Co. Inc.

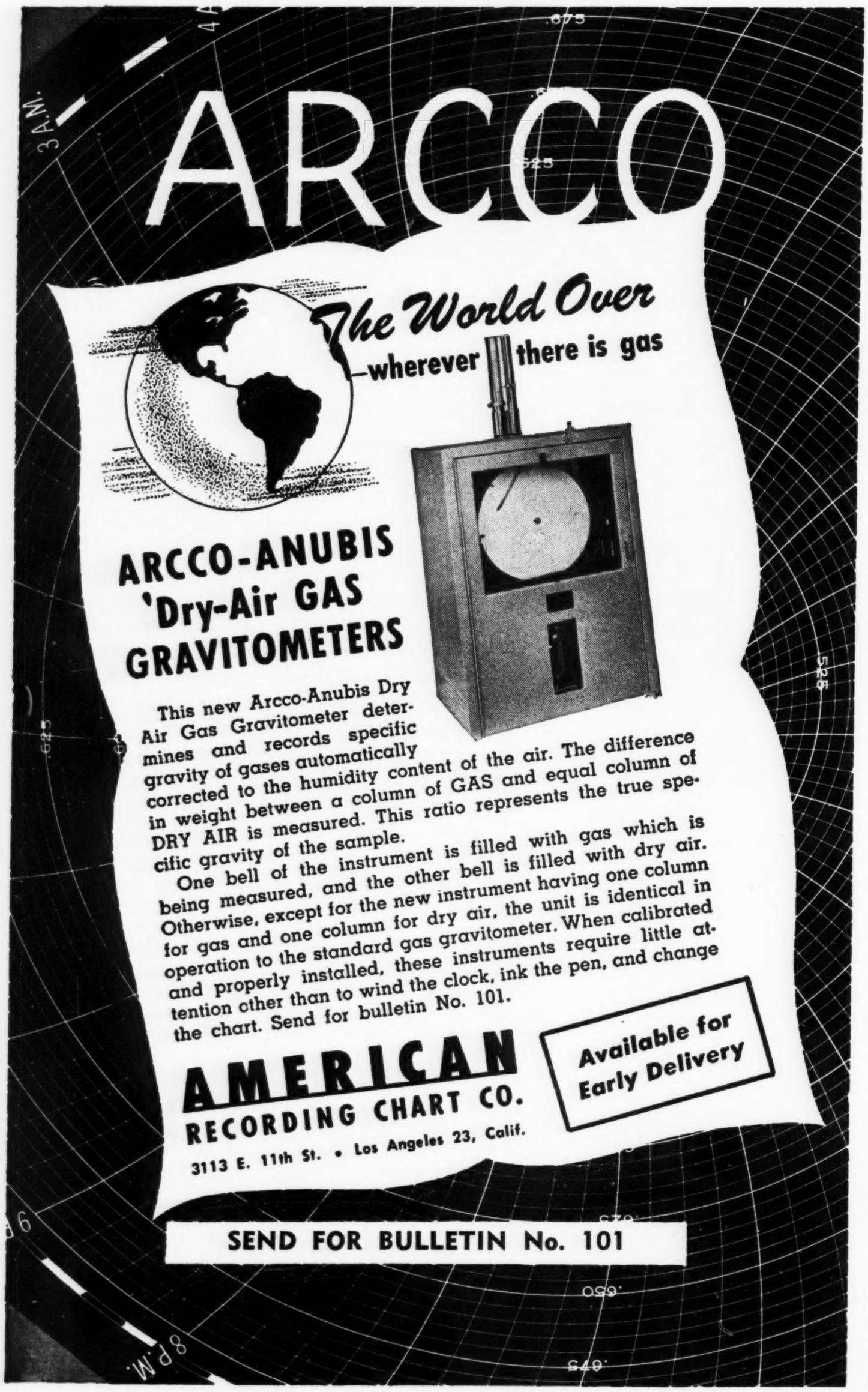
R. V. BURNETTE has been appointed supervisor of gas products for the Chicago, Columbus, and Pittsburgh sales districts of Rockwell Manufacturing Co. Mr. Burnette joined Pittsburgh Equitable Meter Co. in 1926 and has held positions as junior engineer, sales engineer in the Chicago territory, sales supervisor for Rockwell's Pittsburgh-DuBois Division, and member of the Pittsburgh sales staff.

ROBERT C. HOOD, 32, has been elected president of Ansul Chemical Co., Marinette, Wis., succeeding his brother, the late Francis J. Hood. The new president had been named vice president less than two years ago. Ansul also created a dual vice presidency with LEONARD C. McKESSON named vice president in charge of sales and ARTHUR C. POPE promoted to vice president in charge of manufacturing.

JOHN CHERRY has been named chief engineer of the C. L. Bryant Corp., Cleveland, Ohio, and he will work on development of the Sphinx and Sphinx-ette line of appliances. Mr. Cherry was formerly factory manager of the Lennox Furnace Co. and its American Metal Products Division, both in Fort Worth.

EDWIN A. BOOTH has been appointed general manager of sales of the National Supply Co.'s Spang-Chalfant Division, Ambridge, Pa. A member of the National Supply organization since 1929, Mr. Booth has been manager of the Pittsburgh district since 1946.

FRANK HUGHES, formerly with The United Light & Railways Service Co., has been named to the new position of director of purchases for Iowa-Illinois Gas & Electric Co., Rock Island, Ill.

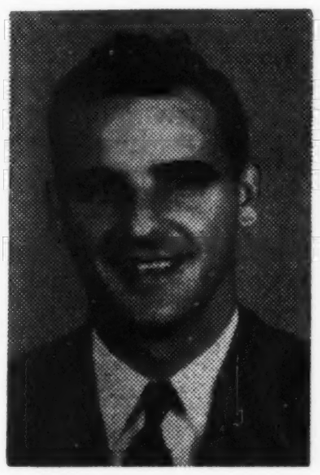

3 A.M.
ARCCO
The World Over
wherever there is gas
ARCCO-ANUBIS
'Dry-Air GAS
GRAVITOMETERS
This new Arcco-Anubis Dry Air Gas Gravitometer determines and records specific gravity of gases automatically corrected to the humidity content of the air. The difference in weight between a column of GAS and equal column of DRY AIR is measured. This ratio represents the true specific gravity of the sample.
One bell of the instrument is filled with gas which is being measured, and the other bell is filled with dry air. Otherwise, except for the new instrument having one column for gas and one column for dry air, the unit is identical in operation to the standard gas gravitometer. When calibrated and properly installed, these instruments require little attention other than to wind the clock, ink the pen, and change the chart. Send for bulletin No. 101.
AMERICAN
RECORDING CHART CO.
3113 E. 11th St. • Los Angeles 23, Calif.
Available for Early Delivery
SEND FOR BULLETIN No. 101
8 P.M.

HILDING CARLSON has been appointed advertising and sales promotion manager of Selas Corp. of America, Philadelphia. Recently connected with E. Holley Poe & Associates, Mr. Carlson had formerly served as a regional executive for the U.S. Bureau of Labor Statistics. The appointment of STUART A. WHITEHURST as Pacific coast representative has also been announced. He will headquarter in Los Angeles.

HERBERT A. WATSON, vice president and assistant general manager of Lincoln Brass Works Inc., Detroit, since 1945, resigned effective Jan. 1. He had been associated with GAMA and with Pennsylvania Power & Light Co., Allentown, before joining Lincoln Brass. DONALD E. DuPEROW, Lincoln's plant superintendent who has been with the firm for 11 years, has been elected to succeed Mr. Watson as vice president.

W. NED RAST and JOSEPH P. CAIN have been named manager and assistant manager, respectively, of the Dallas branch of Bryant Heater Division, Affiliated Gas Equipment

W. Ned Rast



Joseph P. Cain

Inc., Cleveland, Ohio. Mr. Rast was most recently associated with Catlett Engineers, and Mr. Cain was Bryant's factory representative in the east Texas territory.

WILLIAM E. BRICE CO., Houston, has been appointed district representative in southern Texas for The Electric Products Co., Cleveland, Ohio. In addition to industrial experience with General Electric Co., Houston Lighting & Power Co., and the Wilson Electric Equipment Co., Mr. Brice is well acquainted with oil field and refinery operations.

FRED C. HALL has succeeded CLARENCE G. WOOD as director of sales for The American Coach & Body Co., Cleveland, Ohio. Mr. Hall has been associated with the firm since 1936 and since 1946 has headed the company's California division with headquarters in Oakland.

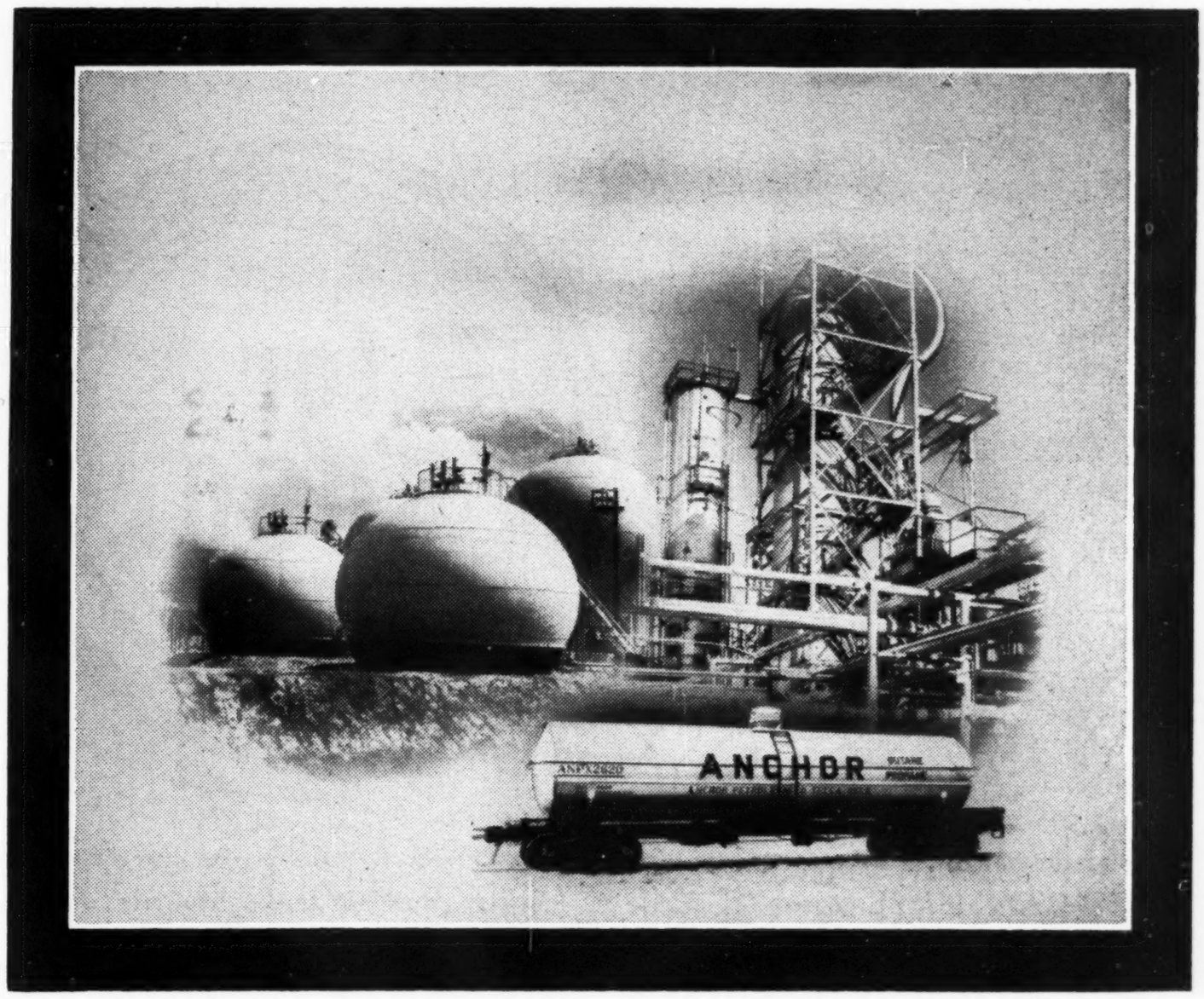
LT. COL. ALBERT E. HIGGINS, onetime manager of the AGA Natural Gas Department and former vice president of the Rockwell International Corp., New York City, has recently received a belated army commendation for his part in closing the Southern "National Interest" Route during the period of June 16, 1946, to Feb. 28, 1947. The citation, tendered by Brig. Gen. Bob E. Nowland, commanding officer, Pacific Division, Air Transport Command, praises Col. Higgins' performance in coordinating ATC activities with Pan-American Airways and officials of various governments in closing ATC installations at airfields through certain South Pacific island chains and transferring them to proper agencies. Col. Higgins was associated with Rockwell from 1937 to 1942 and in 1947, following war service, returned to that company in the executive capacity with Rockwell International.

EDWARD D. KEMBLE has been appointed plant manager of the automatic heating division of General Electric Co.'s air conditioning department. Mr. Kemble was formerly plant manager of the Clark Equipment Co.'s lift truck plant in Battle Creek, Mich.

WALTER M. BARBER, manager of Perfection Stove Co.'s Cleveland district sales office since 1942, has been named sales promotion and advertising manager of the company. Since joining the firm in 1915, Mr. Barber has represented Perfection in a number of district offices, in Europe, and around the world from New Zealand to northern Manchuria.

LEO A. KRAEMER, former superintendent of the by-product coke division of the Pittsburgh Steel Co., has been named operations engineer for the engineering and construction division of Koppers Co. Inc., Pittsburgh. Mr. Kraemer was associated with Koppers Construction Co. from 1917 to 1933. As operations engineer he will work with coke plant managers.

CHARLES A. HEATH, operations supervisor for Heath Tree Service Inc., Wellesley, Mass., was promoted to vice president in charge of operations as of Dec. 1. His office is in Richmond, Mich. GEORGE A. MULDOON, office manager at the company's headquarters, has been elected assistant treasurer and will continue in both capacities.



call anchor first

LP-Gas for: Stand-by Plants - Peak-load Demands - Industrial Plants - Cities and Towns

From our strategically-located plants we are able to give quick delivery on high-quality ANCHORGAS, Butane-Propane. Shipments by rail, water, or transport. For dependable gas service, call us before you renew your contract. Ask about Anchor's special contract.

ANCHOR PETROLEUM COMPANY

Atlas Life Bldg. Tulsa, Oklahoma

- OBITUARIES -

CHARLES C. BRYANT, 64, president and general manager of the Ocala (Fla.) Gas Co., died recently at Durham, N.C., where he had been a patient at Duke University hospital.

FRANCIS R. SHEA, 52, assistant commercial manager of the Iroquois Gas Corp., Buffalo, N.Y., died Nov. 9. He had been employed by the gas company for 30 years.

FRANK L. CONRAD, former president and director of Iowa-Illinois Gas & Electric Co., Rock Island, Ill., died recently at his home in Westport, Conn. Prior to his retirement in May 1948, Mr. Conrad had also been president and director of The United Light & Railways Co., Continental Gas & Electric Corp., and American Light & Traction Co.

JOHN C. PANKOW, director of sales for Detroit Michigan Stove Co., died Nov. 30 after a brief illness. He was recently named chairman of the National Committee for LP-Gas Promotion (*GAS*, Dec., p. 59). Mr. Pankow joined the Michigan firm as an office boy 38 years ago.

FRANCIS J. HOOD, 44-year-old president of Ansul Chemical Co., Marinette, Wis., died suddenly Nov. 10 while on a business trip. Mr. Hood was elected to the presidency less than a year and a half ago. He had served as vice president, secretary-treasurer, and originally, California representative.

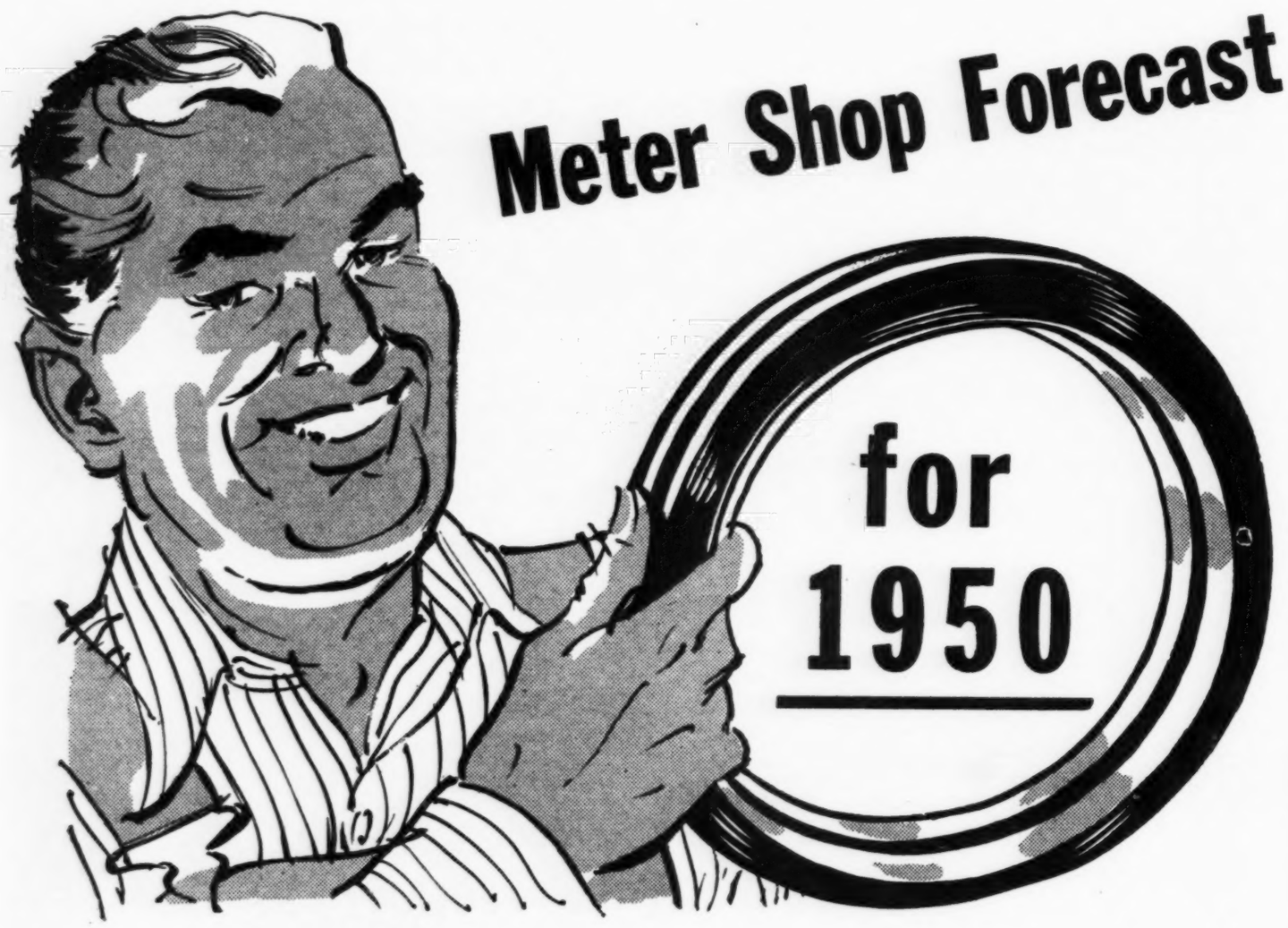
JACOB D. VON MAUR, consulting engineer for the Consumers' Gas Co. of Toronto, Canada, died Nov. 22 in Toronto. He became associated with the Canadian company 24 years ago as engineer of gas distribution and had held that position until a few years ago. A past president of the Canadian Gas Assn., Mr. von Maur was an active AGA member and also belonged to numerous other industry organizations. Last April a dinner was held in St. Louis at which 800 colleagues from the United States and Canada paid tribute to Mr. von Maur's contributions to the science of public gas supply and service.

J. D. von Maur

PAUL A. FUSSELMAN, general superintendent of Philadelphia Electric Co.'s gas transmission and distribution department, died recently at the age of 63, apparently the victim of a heart attack. He had been associated with the utility industry since 1909.

FRANCIS H. CRAWFORD, who retired in 1930 as vice president and general manager of the Ohio Fuel Gas Co., died Nov. 20 in Columbus. Mr. Crawford was 82.

CECIL E. BAYNE, 46, manager of the Arkansas Louisiana Gas Co. at Hot Springs, Ark., died on Nov. 21.



Hundreds of thousands more VULCAN Diaphragms will be used this year than ever before. More and more gas companies are adopting VULCAN Diaphragms as standard equipment.

The reasons for this preference are obvious. VULCAN Diaphragms excel in uniformity of shape and thickness. They are pressure-tested for tightness as the last step in the assembly line, thereby insuring trouble-free installation—and are so securely fastened to the rings by special wire that tie leaks are virtually impossible.

Because they contain no oil and need no oiling, VULCAN Diaphragms contribute to more accurate metering. They save costly time, labor and materials, and are clean to handle.

For long service life with no maintenance problems, follow today's trend: specify VULCAN Diaphragms for 1950.

Vulcan
PROOFING COMPANY
FIRST AVENUE & 58th STREET • BROOKLYN 20, NEW YORK

CATALOGS

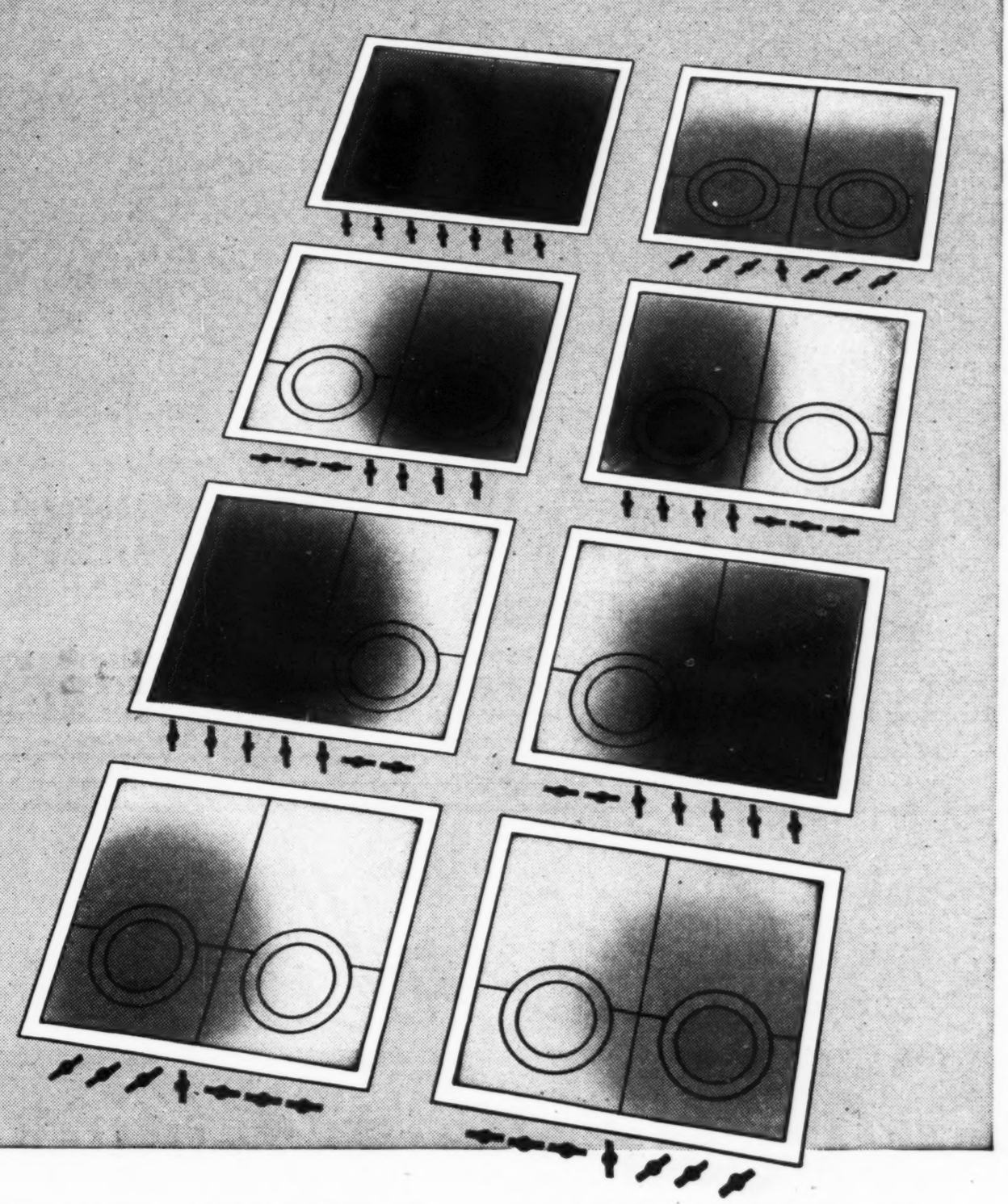
ROOTS-CONNERSVILLE BLOWER CORP., Connersville, Ind.—Bulletin 31-B-17, "Rotary Positive Type XA Gas Pumps," discusses the advantages of the rotary positive principle. Sectional views are included, along with a chart to illustrate volume and power characteristics of constant pressure and variable-speed, multi-speed, or constant-speed drives. A rating table covers low, medium and high pressure ranges, and a dimension sheet for 18 standard sizes is included.

SURFACE COMBUSTION CORP., Toledo 1, Ohio—A new four-page folder describes the application of the dry cyaniding process to the operation of continuous and batch-type industrial furnaces. Automotive parts treated by this process, according to the bulletin, include washers, bushings and bolts, gear shafts, tractor parts, and push rods. A copy of the brochure may be obtained from the company's advertising department.

GENERAL ELECTRIC CO., Automatic Heat-Division, Bloomfield, N. J.—Gas boilers for steam, vapor, hot water, and radiant panel heating systems are described in Bulletin PM 12-0002 recently issued. Covering eight sizes, with AGA output ratings from 76,800 to 345,600 Btu/hr, the bulletin includes a cutaway view, photos of control and safety features, dimensions, ratings, and specifications.

ONLY GARLAND THE LEADER

gives you top heat flexibility like this . . .



because only GARLAND

gives you FRONT-FIRED BURNERS

Pictured here are only a few of the infinite number of heat variations you get on the Garland All-hot Top.

Seven, yes, *seven* individually controlled burners —all *front-fired* give the chef *any* heat he wants— *anywhere* on the cooking top. Garland helps the chef prepare better food—faster. Garland helps save fuel. Garland helps reduce the cost per meal served.

All Garland models are available in stainless steel and equipped for use with manufactured, natural or L-P gases. Consult your Garland Food Service Equipment Dealer. He is an expert advisor.

GARLAND* THE TREND IS TO GAS

FOR ALL COMMERCIAL COOKING

Heavy Duty Ranges • Restaurant Ranges • Broilers • Deep Fat Fryers • Toasters
Roasting Ovens • Griddles • Counter Griddles

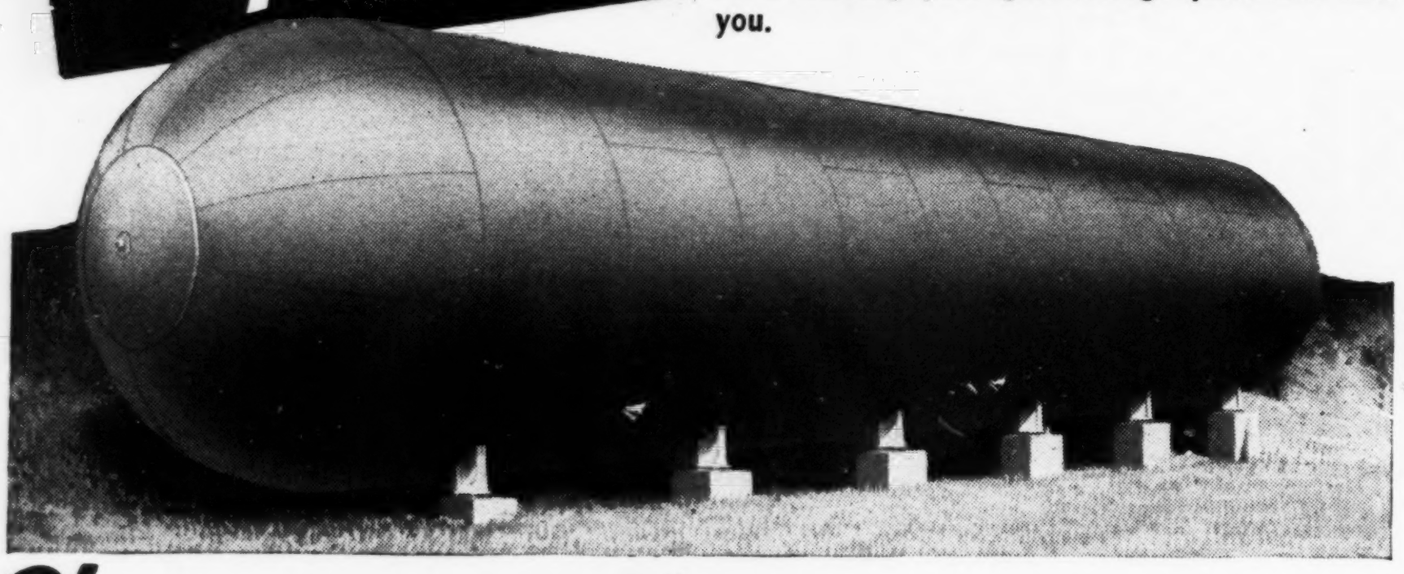
PRODUCTS OF DETROIT-MICHIGAN STOVE CO., DETROIT 31, MICHIGAN

*REG. U. S. PAT. OFF.

STAMANCO

HI-PRESSURE TANKS

Made in both horizontal and vertical types for storing all types of gases under pressure, STAMANCO Hi-Pressure Tanks are soundly engineered and ruggedly built to give long dependable service. All-welded or riveted construction. We would appreciate the opportunity of discussing your gas storage problems with you.



The STACEY MANUFACTURING Co.
SINCE 1851
CINCINNATI 16, OHIO

GAS HOLDERS • HI-PRESSURE TANKS • PURIFIER BOXES

ENGINEERS • FABRICATORS • CONSTRUCTORS

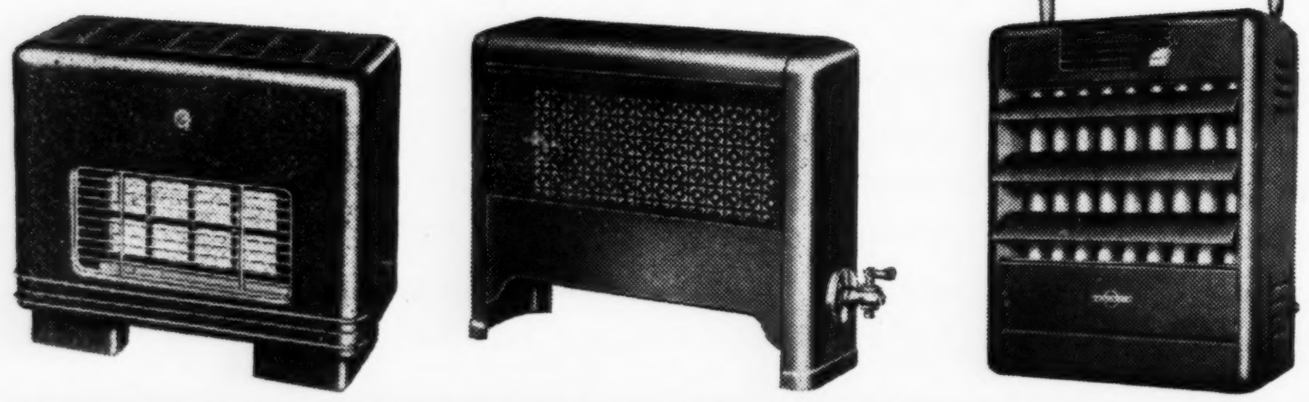
An Independent Organization Not Affiliated With Any Other Builders of Gas Holders

Peerless

Gas Heating Products

Styled for Beauty — Built for Duty

A. G. A. APPROVED FOR ALL GASES



VENTED CIRCULATORS	ENCLOSED RADIANT HEATERS	SUSPENDED FAN TYPE UNIT HEATERS
20,000 to 60,000 B.T.U. Sizes No. 7770 Series has Radiant Front Styling No. 7780 Series has Closed Front Styling	20,000 - 28,000 B.T.U. No. 6190-D No. 6192-D Other sizes and styles for rooms and fireplaces	65,000 to 200,000 B.T.U. Sizes For Domestic and Commercial uses

Write today for descriptive literature on this complete line that is made to sell . . . made to last . . . made to satisfy.

PEERLESS MANUFACTURING CORPORATION LOUISVILLE 10, KY.

PRECISION THERMOMETER & INSTRUMENT CO., 1576 Brandywine St., Philadelphia—Data on liquid-in-glass industrial thermometers are presented in tabular and sectionalized form in this company's new Bulletin E. Graphic illustrations show all basic models, sizes, forms, and attachments with simplified application data to enable the user to select the proper thermometer for any industrial installation. Copies are available upon request.

CONTINENTAL INDUSTRIAL ENGINEERS INC., 176 W. Adams St., Chicago—Booklet No. 127 describes the scope of this company's services to industry. The firm specializes in manufacturing, engineering, construction, consultation and design in connection with complete industrial plants, production lines and special automatic machines, and industrial furnaces, ovens and dryers.

HENDERSON FURNACE & MANUFACTURING CO., Sebastopol, Calif.—"What's Behind Henderson Forced Air Gas Furnaces" is the title of a new copyrighted booklet which pictures the manufacture of furnaces from first shearing of metal to final testing and shipment. Models discussed are the Clipper, Clipperette, and Hendy "60."

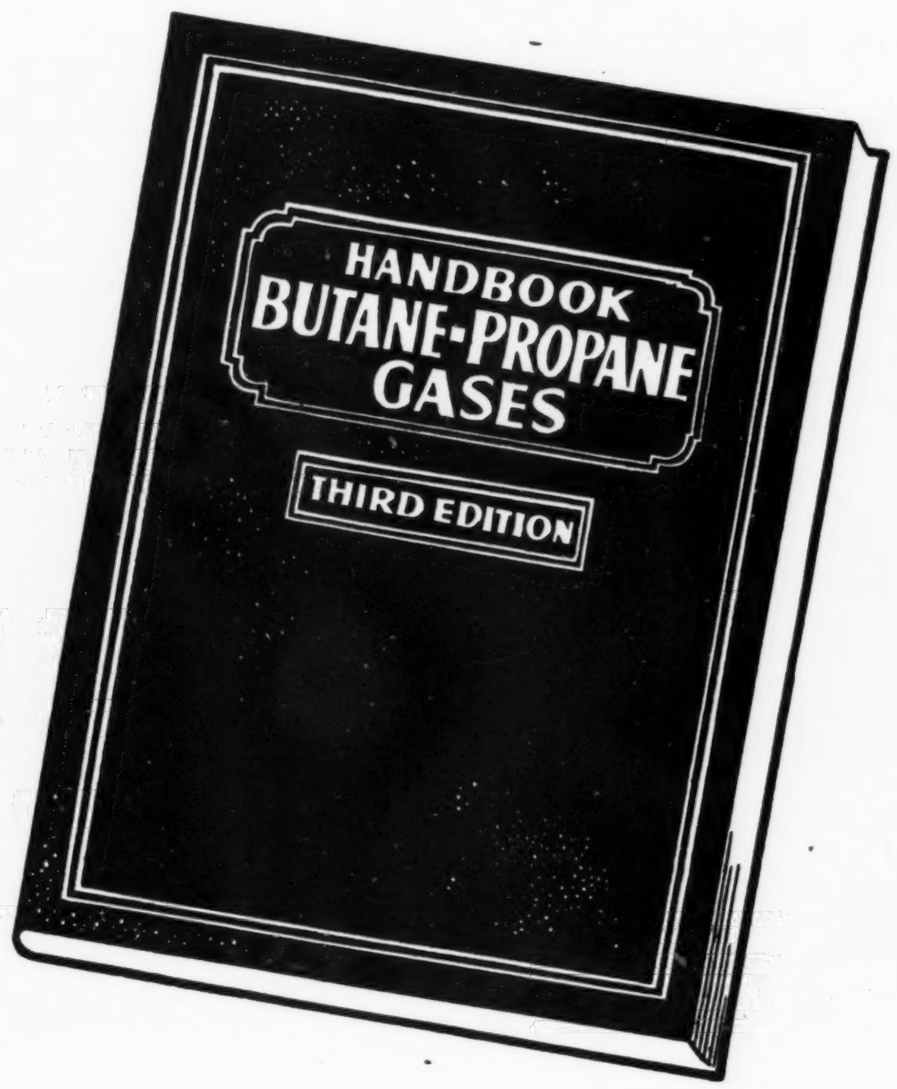
THE B. F. GOODRICH CO., 5400 E. Olympic Blvd., Los Angeles, Calif.—A new catalog section on this company's lines of welding hose is now available upon request. The section illustrates and gives data on the Oxy-Acetylene and Duo-Weld hoses and describes their construction.

GAR WOOD INDUSTRIES INC., Findlay Division, Findlay, Ohio—Bulletin 306 is devoted to the Buckeye Model 306 utility ditcher. Design and construction, applications, and specifications are discussed.

SALES SLANTS

MANUFACTURERS LIGHT & HEAT CO. of Pittsburgh, in conjunction with 12 gas appliance dealers, recently sponsored a cooking school in Bradford, Pa., that drew a total of 3575 women in three afternoons. Excellent cooperation through newspapers, including display advertising by 10 of the dealers as well as generous editorial comment, helped to make the affair a success. The company also obtained, through registration cards, the names of many housewives whose ranges were more than 10 years old, qualifying them for selling efforts on the part of the company.

BROOKLYN UNION GAS CO.'s sales efforts were rewarded with a new record high which was established in October when net appliance sales by the new business department totaled over $610,000. This was 78% greater than the corresponding month in 1948 and was the largest sales record for any October in the company's history. It also marked the sixth consecutive month in 1949 that appliance sales exceeded the half-million-dollar mark and the third month in the company's history that more than $600,000 of appliances were sold. Over $200,000 of house heating equipment alone was sold to domestic customers.



352 PAGES of Technical Facts, Charts, Diagrams, Photographs, including Latest Processes and Materials

THE ONLY COMPLETE REFERENCE BOOK ON LIQUEFIED GAS ENGINEERING, INSTALLATION AND OPERATING METHODS

CONTENTS:

The Progress of the Industry
The ABC of LP-Gas
Properties of Hydrocarbons in LP-Gas
Properties of Butane-Propane Mixtures
Volume Correction Factors
Analytical Determination and Testing
Natural Gasoline Plants, Recycling Plants, Oil Refineries
Delivery by Truck, Rail, Water, Pipe Lines
Storage Tank and Pressure Vessel Design
Liquid Metering and Pumping Systems
Installing and Servicing LP-Gas Systems
Semi-Bulk Systems
Bottled Gas Systems
Gas Utility Service from Central Plants
Multiple Utility Service from a Central Plant
Comparative Performance with Other Fuels
Appliance Installation and Testing
Domestic Applications
Commercial Applications
Industrial Applications
Enrichment, Peak Load and Standby Uses
Fuel for Internal Combustion Engines
N.B.F.U. Pamphlet No. 58 (1947)
Motor Carrier Regulations
Unloading Tank Cars
Marine Regulations
Products Liability Insurance
Handy Tables for Field Use
Flame Weeding
Interchangeability of Other Fuel Gases with Natural Gases
Bibliography
Glossary of Terms

$5.00 Per Copy

We pay postage on orders accompanied by check or money order. In California add 15¢ for sales tax.

SEND ORDER TO

GAS

198 South Alvarado Street
Los Angeles 4, California

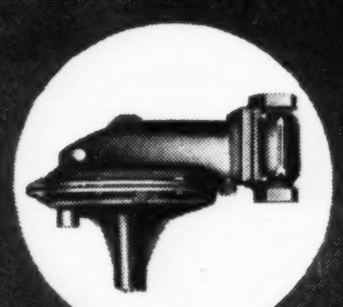
4 INSTALLATION POSITIONS

...for easy connections Spring Top operates pointing either up or down

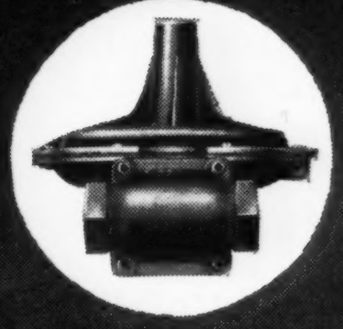
REYNOLDS REGULATOR
NI-2 Model 30
NR 8200 Series

Vertical Position with down flow

Vertical Position with up flow



Inverted Position for use where accumulation of water is problem

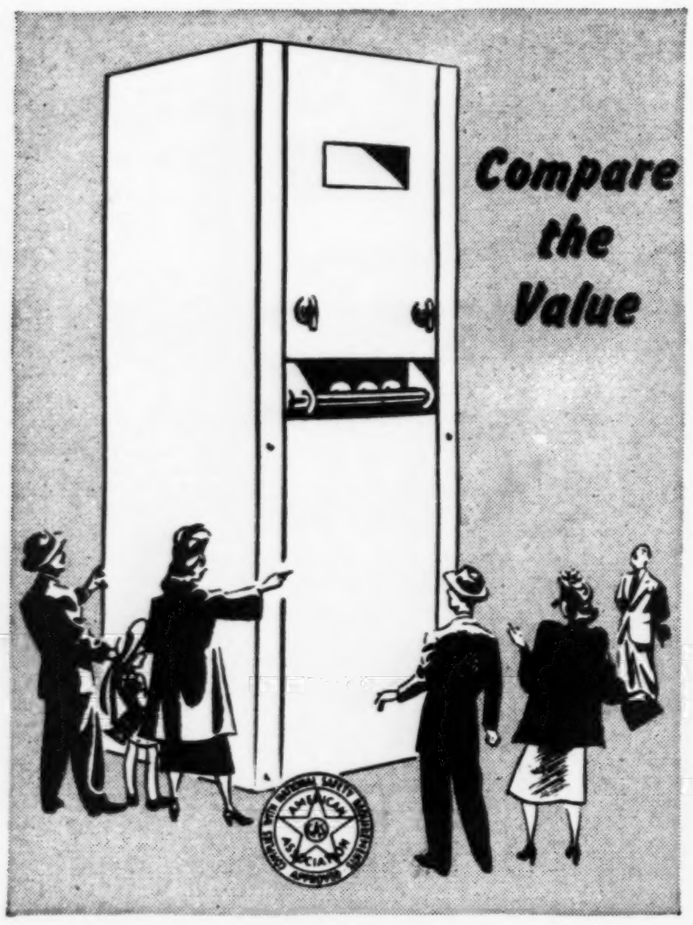


Horizontal Position with flow left to right or by changing setting 180° with flow right to left

1 This regulator is available with any type seal previously made by Reynolds.
2 Quickly installed in existing house piping.
3 May be installed in any position on a 90° setting.
4 Orifice can be changed at any time.
5 To inspect orifice or valve pocket, only an Allen wrench is needed.

Reynolds

GAS REGULATOR CO.
ANDERSON · INDIANA · U. S. A.



NEW
Hendy "60"

A giant in performance and value, a midget in size—that's the new Hendy "60," *made by the makers of the famous Henderson Clipper.* Only 52" high, by 18" x 30", the Hendy "60" fits in a small closet or corner. Yet it provides all the luxury of high-quality, blower-type central heating (with ducts) at a cost competitive with ordinary heating methods for smaller homes.

60,000 B.t.u. Input

- **VENT AT TOP, FRONT**— saves space and facilitates installation.
- **CLIPPER-TYPE, HENDERSON-DESIGNED BLOWER,** precision made in our own factory.
- **HIGH-EFFICIENCY HEAT EXCHANGER** Multi-stream principle, same as used in our Clipper and Clipperette.
- **EVERY UNIT FACTORY-ASSEMBLED** and tested in actual operation.
- **SPECIALIZED EXPERIENCE**—This new unit reflects many years' experience in manufacturing blower-type, gas-fired furnaces exclusively.

Write or wire for catalog-sheet, prices, dealer-opportunities

HENDERSON
FURNACE AND MFG. CO.
Sebastopol, California
CLIPPER · CLIPPERETTE · HENDY "60"

THESE SIX CHAMPIONS in the national 4-H food preparation contest were guests of the prize donor, Servel Inc., at the 28th national 4-H Club Congress in Chicago Nov. 27-Dec. 1. Each received a $300 college scholarship from Servel. Studying Servel's publication, "The Homemaker's Digest," they are (from left to right) Coralie Nell Mullins, Portales, N. M.; Norma Karhoff, Labette, Kan.; Haroldine Amis, Covington, Okla.; Margaret Lee Stevens, Goldsboro, N.C.; Pearl King, Gaithersburg, Md., at the typewriter; and Edith Reimes, Waldo, Wis.

THE AGA LABORATORIES starred briefly in television recently when B. A. McCandless, assistant to the director, appeared with Miss Louise Winslow in her production "Through the Kitchen Window" over Cleveland's station WNBK. The Winslow show, sponsored by The East Ohio Gas Co. *(GAS,* Oct. 1949, p. 77) showcased the activities of the laboratories through the use of souvenir photographs. These photographs were taken during Miss Winslow's visit there a few days previously.

Through this medium televiewers were given an insight into the laboratories' work in conducting tests on gas appliances. Special emphasis was given to the baking test for determining even oven heat distribution. The use of the laboratories' photo reflectometer was demonstrated in a test made on two cakes baked by Miss Winslow.

A NEWCOMER TO THE field of nationally distributed "moderately priced" home appliances is due to put in an appearance early this year when the Murray Corp. of America, Detroit, major steel fabricator and one of the nation's largest producers of automotive bodies and assemblies, starts national distribution of a line of kitchen appliances.

Included are gas and electric ranges, matched steel kitchens, cabinet-sinks, and base and wall cabinets. The first public showing of the Murray line will be at Chicago's Merchandise Mart in January. The corporation's home appliance division will manufacture the items in its new quarter-mile long plant in Scranton, Pa.

SERVEL INC. is introducing its new 1950 models this month with a private preview being held at the Edgewater Beach hotel, Chicago, Jan. 6. Advance publicity on the long awaited model indicates that one of the featured innovations is a 90-second, quick-change interior which has "greater arrangeability" than other refrigerators. The company is also introducing some potent new advertising and promotion schemes.

NEW PRODUCTS

Combination Meter

M. C. MILLER, 1142 Emerson Ave., West Englewood, N.J.

MODELS: B-1 and B-2 multi-combination meter.

APPLICATION: For electrolysis and corrosion investigations and cathodic protection testing in both field and laboratory. Model B-2 provides a compact intsrument for corrosion engineers where the high accuracy claimed for the company's Model 5 is not required, and Model B-1 is for use by junior engineers and cathodic protection operating personnel who require a more rugged instrument.

DESCRIPTION: It is claimed that this model greatly reduces the time required for field and laboratory testing as it eliminates connecting up the many separate instruments frequently required. It weighs about 13 lb and is in a 9x12x6-in. case. Standard flashlight dry cells are used and can be replaced without soldering.

The meter is available with either of two sets of instruments. In Model B-1 the low-resistance voltmeter is 1000 ohms per volt, and the high-resistance voltmeter is 20,000 ohms per volt. In Model B-2 the low is 3000 and the high, 62,500. By use of a circuit selector switch, the voltmeters may be used separately or simultaneously.

Shutoff Valve

THE NORTH AMERICAN MANUFACTURING CO., 4455 E. 71st St., Cleveland, Ohio.

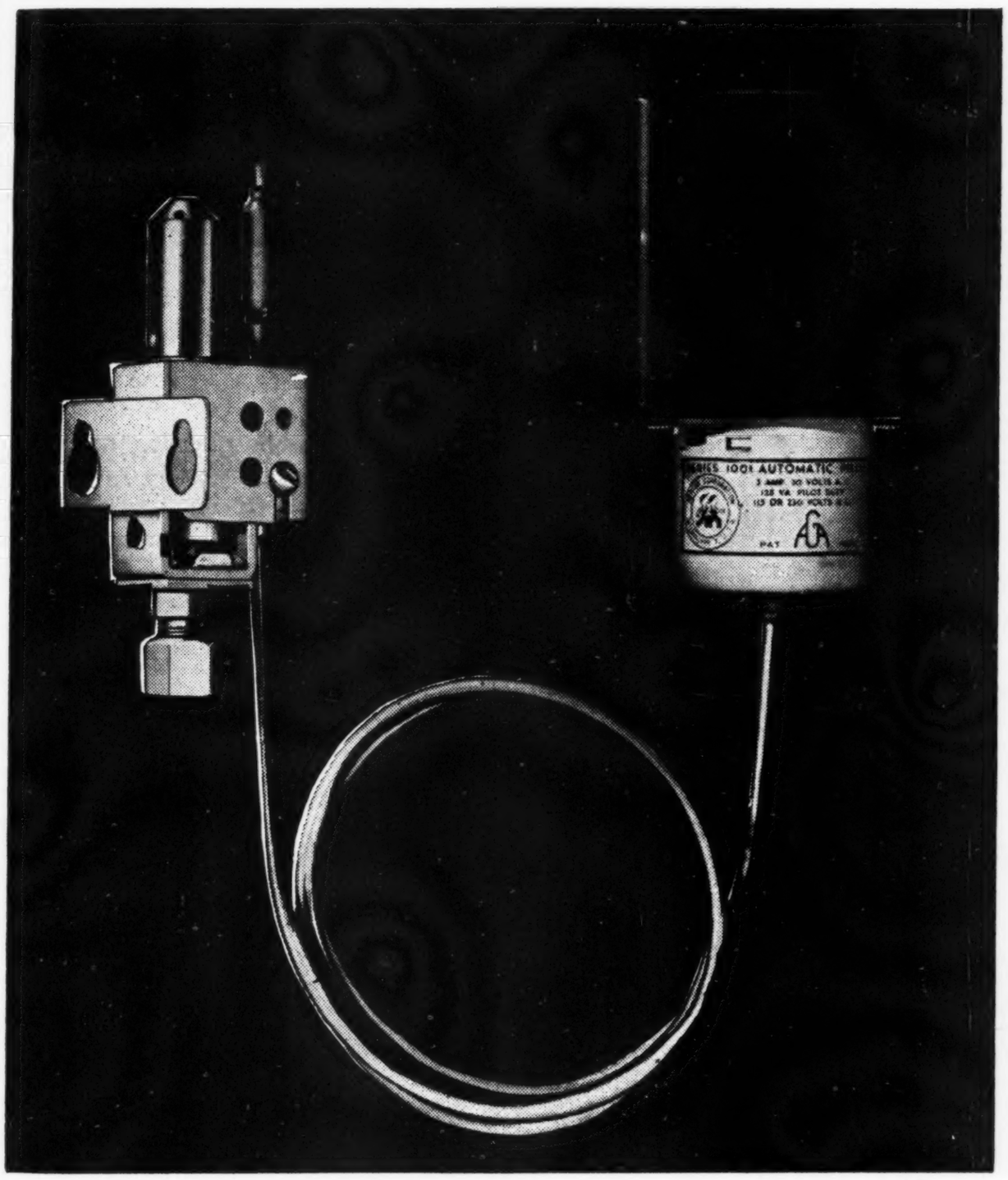
MODEL: Series 21 safety shutoff valve.

APPLICATION: For the protection of industrial furnaces against dangerous accumulations of gaseous or liquid fuels in the event of a power failure.

DESCRIPTION: It is claimed that this

NOW! Perfex Non-Flash GAS SAFETY PILOT

Better Performance . . . added sales features with advanced design



- **NON-FLASH DESIGN**
  ...Gas cannot burn at orifice.
- **NON-PLUG PRIMARY AIR PORT**
  ...Large-opening—air passes through at low velocity and does not draw dirt into pilot.
- **CLEAN BLUE FLAME**
  ...Under all field conditions—no carbon deposit on bulb—insures uniform operation.
- **FOR MANUFACTURED—MIXED—OR NATURAL GAS**
  ...Needs only orifice change...no air adjustment required.
- **LOW GAS CONSUMPTION**
  ...Uses less gas than ordinary pilots.
- **EASY TO REPLACE ORIFICE**
  ...Orifice held in place with simple clip—can't freeze in place.
- **AUTOMATIC RECYCLING TYPE**
  ...If pilot flame goes out, merely relight it... no manual reset required.

Give your customers the benefits of this improved pilot...Your customers will be better satisfied... Your selling will be easier...You'll have fewer service calls...It's good business for *you.*

INTERCHANGEABLE WITH COMPETITIVE PILOTS

Dealers Who Know the Best Ask For

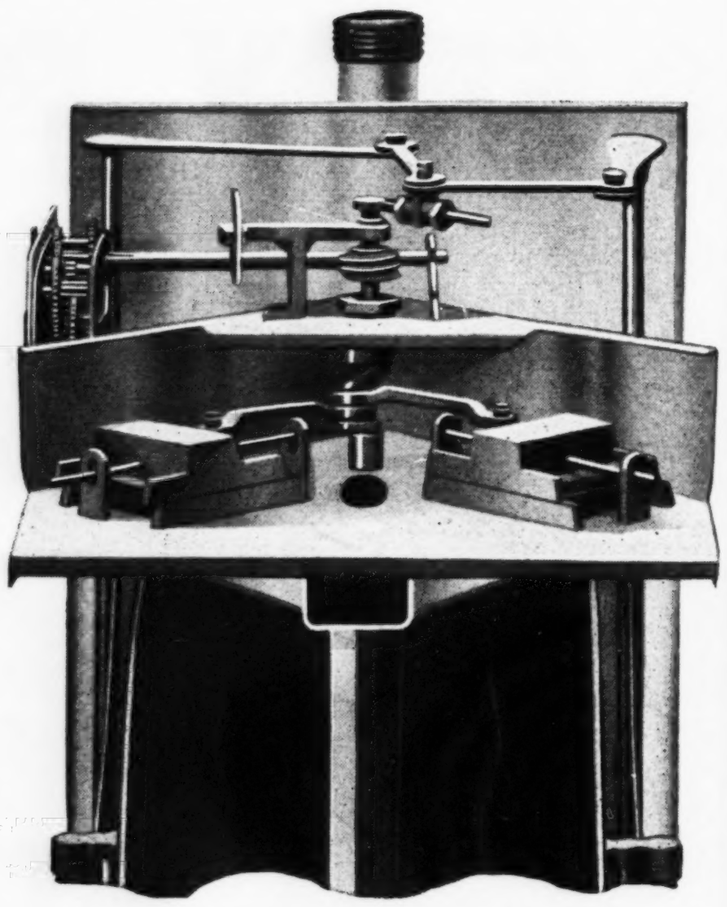
PERFEX
TWIN CONTACT CONTROLS

PERFEX CORPORATION, MILWAKEE, WISCONSIN • *In Canada, Perfex Controls Ltd., Toronto 1, Canada*

AUTOMATIC TEMPERATURE CONTROLS • INDUSTRIAL ENGINE RADIATORS • PROCESS COLOR PRINTS

SUPERIOR GAS METERS

ALL THAT THE NAME IMPLIES



- ***Full Line***
From 150 to 7,500 cu. ft. per hour capacity. For domestic, house heating and industrial use.
- ***Time Tested Quality***
One piece, ribbed steel carriage. Heavy, non-fluttering valves. Flanged cases. Many other proved features.
- ***Fast Parts Service***
Interchangeable parts for "Superior" and other makes.
- ***Nationally Recognized***
Increasingly specified by America's leading gas utilities.

CATALOG UPON REQUEST

SPECIALISTS IN TIN STEEL METERS

Meters • Meter Repairs • Diaphragms • Parts • Accessories

SUPERIOR METER CO., INC.

167 41st Street, Brooklyn 32, N. Y.

EXPERTS IN GAS CHANGE-OVER SERVICE

LET our experienced gas conversion specialists save you time, cost and trouble on every gas change-over project—for natural, manufactured or LP-gas. Our comprehensive service includes:

- ★ Physical and Sales Potential Surveys
- ★ Engineering and Construction Changes
- ★ Appliance and Equipment Adjustments
- ★ Public Relations Planning

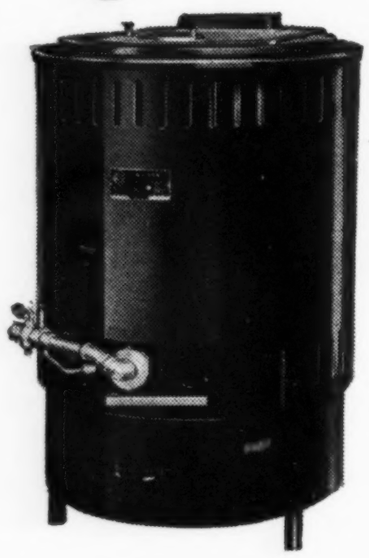
AMERICAN GAS CONVERSIONS, INC.

AGC

ROCKEFELLER CENTER
630 FIFTH AVENUE
NEW YORK 20, N. Y.

A SUBSIDIARY OF
PACIFIC GAS CORPORATION

Incinor
TRADE MARK
REG U S. PAT OFF



GAS-FIRED INCINERATOR

COMPLIES WITH NATIONAL SAFETY REQUIREMENTS · AMERICAN GAS ASSOCIATION · APPROVED

AGA APPROVED

BUILDS BASE LOAD
Plus
Much better than average MERCHANDISING PROFIT

A "MUST" for homes with automatic heat—needed in every home. Commercial size also available.

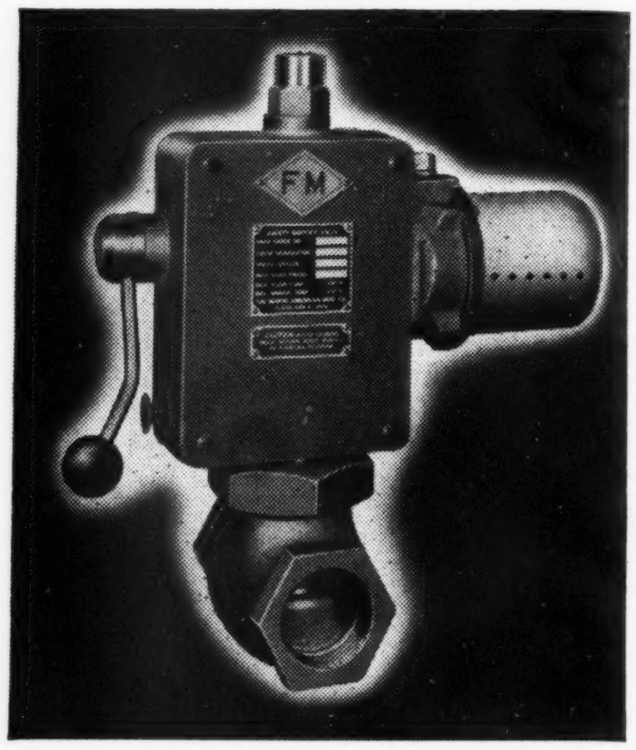
INCINOR SALES MAKE FRIENDS FOR GAS COMPANIES

Write for details.

BOWSER, INC., INCINERATION DIVISION
CAIRO, ILLINOIS

is stopped instantly when the current to the valve's solenoid is interrupted. When power is restored, the valve remains closed until the trouble is corrected, at which time it is reset manually.

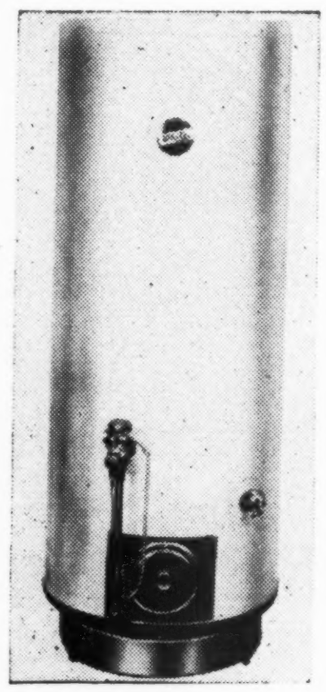
Any number of switches wired in series with the solenoid can protect the installation against explosion hazards resulting from failure of air pressure, gas or oil pressure, etc., in addition to general power failure, or the



valve may be tripped closed manually if desired. It cannot be wedged or propped open with power off since the resetting handle is independent of the valve stem.

The company's Bulletin 21 gives complete engineering information.

Water Heater



A NEW WATER heater, "Water Hotter," has been announced by White Products Corp., Middleville, Mich. Features include special tank construction, single port film-of-flame burner, Robertshaw-Grayson thermostatic controls, spiral center flue baffle, and adaptability to natural, manufactured, or LP-Gas. The heater is available in 30-gal size through White distributors.

Slide Chart

AIR REDUCTION CO., 60 East 42nd St., New York 17, N.Y.

MODEL: Airco oxyacetylene machine gas cutting slide chart.

DESCRIPTION: The chart covers two of the most widely used cutting tips—the style 124 and the high-speed Airco 45. The tips are available in 18 different sizes and all are included in the chart. By sliding the chart to the indicated tip number, oxygen and acetylene pressures, speed in inches per minute, gas consumption, and approximate width of kerf are all readable down one column. Cleaning drill sizes also are indicated.

Free copies of the pocket-size chart may be obtained from the above address or from any Airco sales office.

demand DETROIT CERTIFIED CONTROLS

designed right
built right
proven right

When you install DETROIT Certified Controls you are providing your customers with the best in control equipment. DETROIT Certified Controls are designed and built to fit your customer's needs—giving real economy and reliability through years of trouble-free service. This is true of the entire DETROIT line, one of the most complete in the heating field. Add to this the fact DETROIT has been famous for quality for over 70 years and you have an unbeatable combination. But DETROIT goes even further, certifying every control in its line—backing you, your work and your reputation. For helpful information on ordering and installing DETROIT Certified Controls, on oil and gas heating units, send for the colorful DETROIT Catalogs today.

No. V-570

No. V-570 "Bi-flex" Gas Valve—An electrically operated valve for main supply line to burner. Step-opening feature provides quiet ignition. Shut-off is positive, operation quiet. Controlled by No. 411 Thermostat for uniform room temperature. Write for Bulletin No. 201.

No. 411 Thermostat—A sensitive and accurate "timed-cycling" thermostat for all types of heating systems. Provides extremely close control of room temperature. Attractively styled, easily installed and adjusted. Write for Bulletin No. 193.

No. 411

DETROIT
LUBRICATOR COMPANY

5900 TRUMBULL AVE., DETROIT 8, MICHIGAN

Division of AMERICAN RADIATOR & Standard Sanitary CORPORATION

CANADIAN REPRESENTATIVE: RAILWAY & ENGINEERING SPECIALTIES, LTD.—MONTREAL, TORONTO, WINNIPEG

"DETROIT"

DETROIT HEATING AND REFRIGERATION CONTROLS • ENGINE SAFETY CONTROLS • FLOAT VALVES AND OIL BURNER EQUIPMENT • DETROIT EXPANSION VALVES AND REFRIGERATION ACCESSORIES • STATIONARY AND LOCOMOTIVE LUBRICATORS

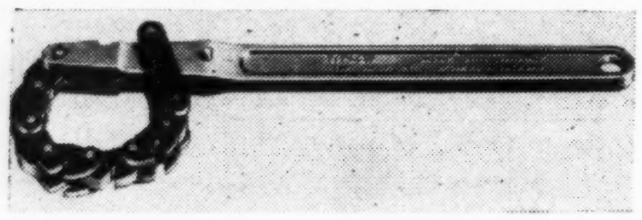
Serving home and industry AMERICAN-STANDARD • AMERICAN BLOWER • CHURCH SEATS • DETROIT LUBRICATOR • KEWANEE BOILER • ROSS HEATER • TONAWANDA IRON

Link-Grip Wrench

AMERICAN MACHINE WORKS INC., Racine, Wis.

MODEL: Multiple-jaw, positive grip wrench.

APPLICATION: For holding pipes and solid rounds up to 2 in. in diameter. All types



of pipe fittings and unions can be handled.

DESCRIPTION: The Link-Grip wrench is made with seven hardened jaws. Instead of having only two opposed jaws contacting the surface, all jaws in contact grip the work and pressure is equalized on each jaw. This produces a firm, steady torque for tightening or loosening. The manufacturer claims that there is no danger of crushing or marring pipe.

Protective Coating

BAUER & BLACK, 222 W. Adams St., Chicago 6, Ill.

MODEL: Polyken corrosion protection coating.

DESCRIPTION: Polyken is an oriented polyethylene film with a synthetic adhesive applied to one side; polyethylene plastic has remarkable electrical and chemical resistance properties. An exclusive "calender-orienting" process gives the product elasticity and much greater strength than unoriented, melt-extruded forms of polyethylene.

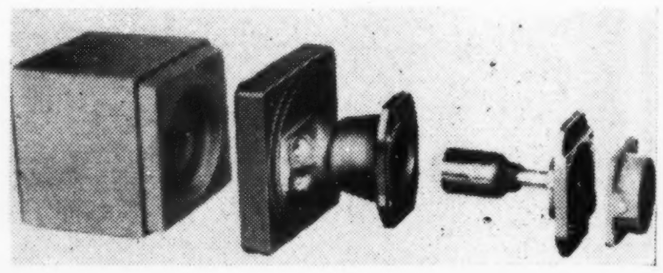
Because of its elasticity, Polyken maintains a permanent pressure around the pipe equal to the tension used in applying it, preventing flow of moisture between the tape and the protected metal.

Tunnel Burners

BRYANT INDUSTRIAL DIVISION, Affiliated Gas Equipment Inc., Cleveland, Ohio.

MODEL: Pyronic tunnel burners.

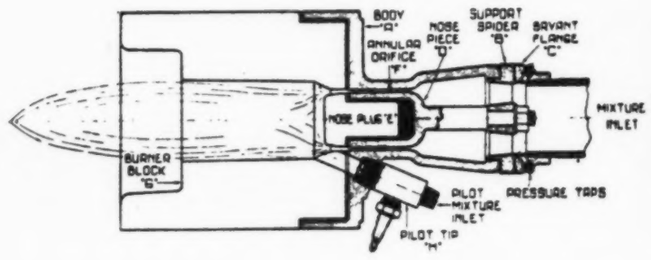
APPLICATION: These burners burn any



combustible mixture of gas over a wide range of mixture pressures.

DESCRIPTION: Available in capacities of from 6000 to 1,660,000 Btu per hour, these burners are designed to operate efficiently without special adjustment anywhere in the 450-3100-Btu gas range. Mixture pressures used may run from 0.1-in. w.c. to 24 oz or more, making possible low turn-down and high-pressure operation for high-temperature operation.

The burners may be lighted from outside or inside the furnace, either manually or by



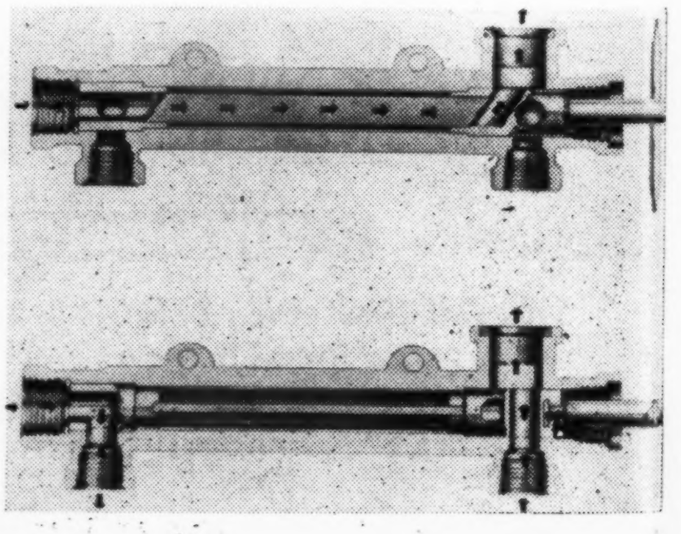
spark plug blast pilot furnished for push-button ignition. For operations up to approximately 2200°F, high-grade super duty refractory blocks are supplied; for higher temperatures, sillimanite blocks are used. Combustion blocks are shipped assembled.

An accessory reversible flange and mounting bracket are available to provide five different mountings to fit the burners to furnace walls from 4-in. to 16-in. thickness.

Meter Bar

SECURITY VALVE CORP., 410 San Fernando Rd., Los Angeles 31, Calif.

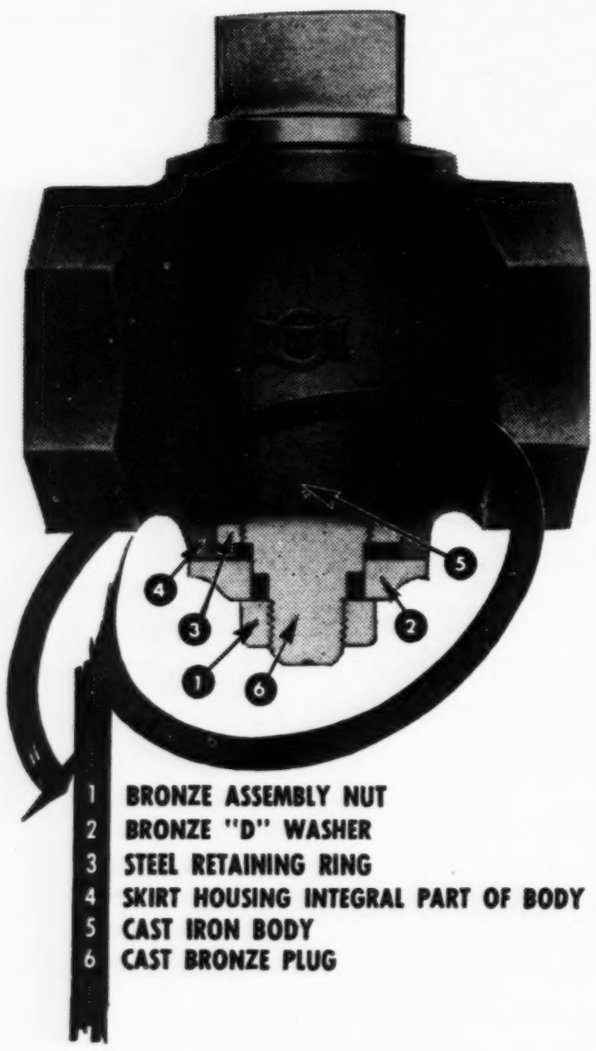
MODEL: Security By-Pass meter bar.



HAYS®

TAMPER-PROOF GAS STOPS

FEATURES


1 BRONZE ASSEMBLY NUT
2 BRONZE "D" WASHER
3 STEEL RETAINING RING
4 SKIRT HOUSING INTEGRAL PART OF BODY
5 CAST IRON BODY
6 CAST BRONZE PLUG

- Tamper-Proof Design with Non-Removable Plug.
- Extra Grade Gray Iron Body, Gas Service Bronze Plug.
- Steel Retaining Ring Prevents Removal of Plug.
- Steel Retaining Ring Assembled to Bottom of Plug—Eliminates Possible Damage to Precision Ground Surface of Plug and Body.
- Steel Retaining Ring Threaded and Staked to the Largest Metal Diameter on Bottom of Tapered Plug—Assures Retention without Distortion.
- Steel Retaining Ring Anchored without Drill Hole or Pin—Eliminates Possible Shearing of Plug.
- Steel Retaining Ring Located below Shoulder of Body—Permits Freedom for Service Adjustment of Plug.
- Steel Retaining Ring Recessed and Inaccessible within Iron Body—Gripless and Shearless.
- Plug and Body Precision Ground and Matched for Perfect Seating.
- Individually Tested Under Rigidly Controlled Inspection.
- Lubricated with a Compound of Greases Suitable for Use with Manufactured, Natural or Liquid Petroleum Gases.
- Obtainable in a Variety of Patterns.

Write for Folder 120–C

AVAILABLE IN

Black or Galvanized

Flat Head Less Check
Flat Head With Check
Flat Head With Lock-Wing

Sizes; ¾"—1"—1¼"—1½"—2"

Also HAYS STANDARD

HEAVY PATTERN IRON BODY GAS STOP

For 75 Years the Gas Industry has relied on HAYS Iron Body Gas Stops

APPLICATION: For changing meters quickly without interrupting service.

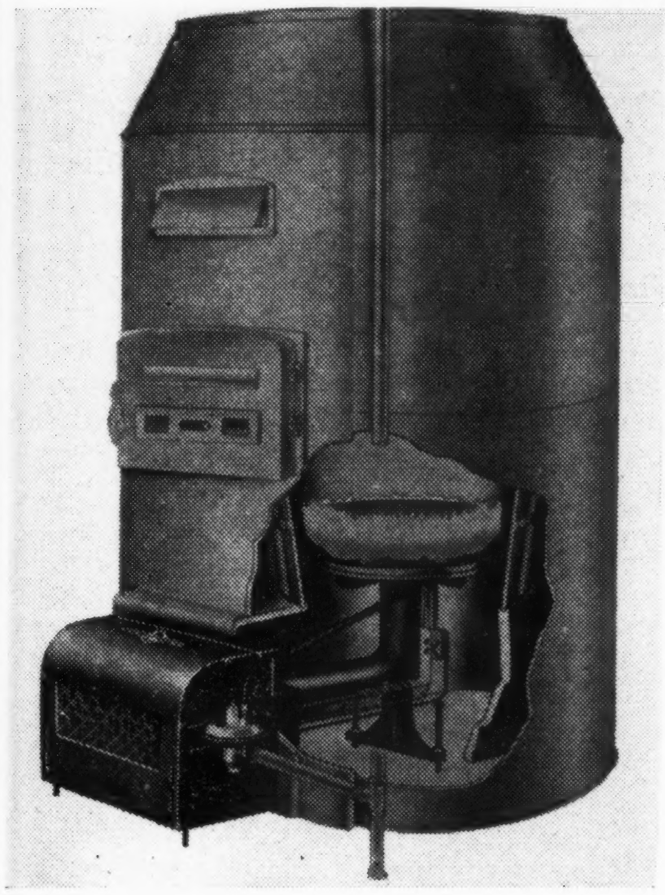
DESCRIPTION: With a twist of the wrist the two precision machined brass valve plugs may be rotated in one quarter-turn to by-pass the supply direct to the customer. While in by-pass position the meter may be changed without interrupting the supply. The new meter may be purged by rotating the meter bar wrench to the purge position indicated on the cast iron body. Connecting the meter outlet to the meter bar and rotating the meter bar wrench to the service position completes the change. The by-pass meter bar wrench cannot be removed while in the by-pass position.

Conversion Burner

PERFECTION STOVE CO., 7609 Platt Ave., Cleveland 4, Ohio.

MODEL: Superfex.

APPLICATION: For use with natural, mix-



ed, manufactured or LP-Gas.

DESCRIPTION: This unit, which carries the official AGA listing symbol, has an automatic gas safety pilot, gas valve, pressure regulator, thermostatic control, and pilot igniter. The burner has no joints or pockets, and the cast iron manifold and brass orifice permit proper adjustment of gas to the exact quantity needed for any size home. Its flame spreader will withstand extreme heat shock, the manufacturer states, and it will not crack and is non-soot retaining.

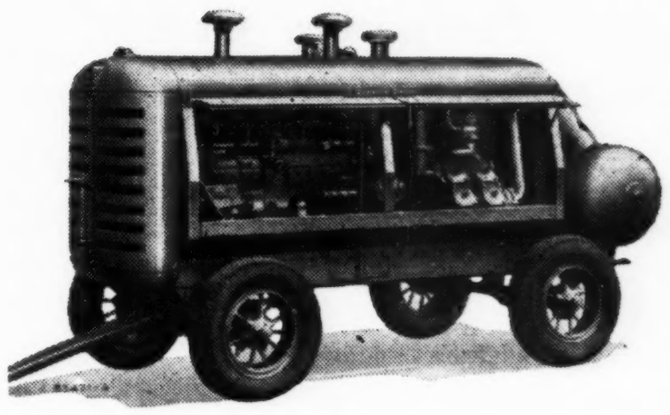
Air Compressor

INGERSOLL-RAND CO., 11 Broadway, New York 4, N.Y.

MODEL: IKA-500 Mobil-Air compressor.

DESCRIPTION: This 500-cfm Mobil-Air has been introduced for those who prefer full diesel-engine drive for their portable compressors. The engine is International-Harvestor's heavy-duty UD-24 which starts as a low-compression gasoline engine and after a warmup period is shifted to full diesel operation by means of a single lever.

A "floating speed" regulator slows down the compressor to the lowest practical working speed that compresses just enough air to



hold the pressure. Full 500-cfm capacity is delivered at rated 100 psi pressure. Other features include a two-stage, air-cooled compressor, Hydro-Shift Flex-Disc clutch, and channel valves. The compressor is also claimed to have a more efficient air cleaner which is easier to service.

The 500-cfm portable is also available with a type H oil engine or a Waukesha gasoline engine.

Compact Furnace

THE LENNOX FURNACE CO., Marshalltown, Iowa.

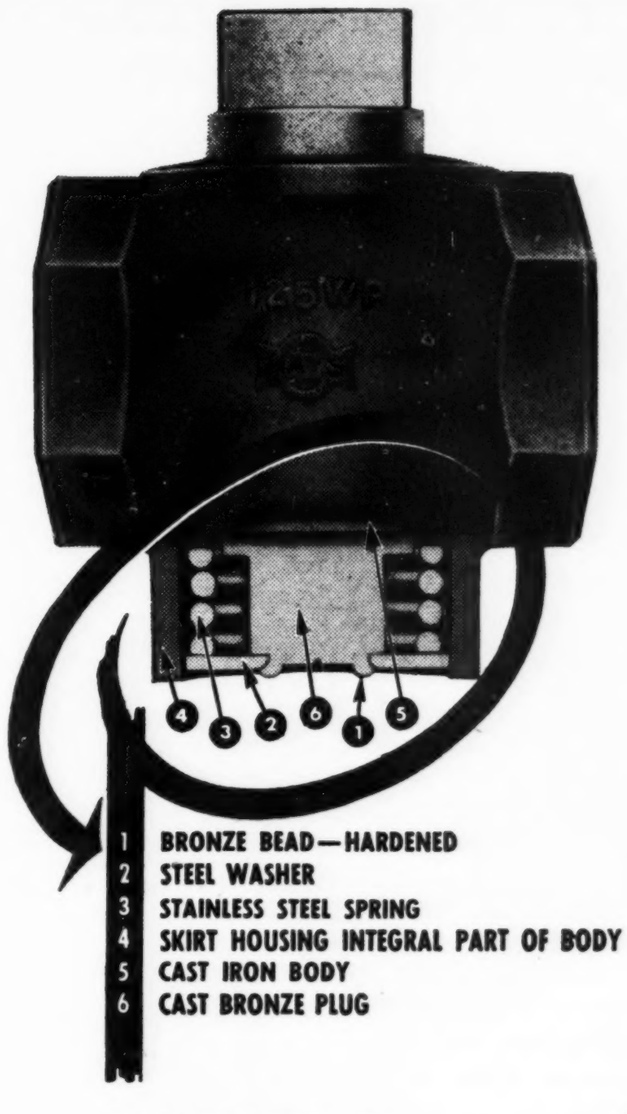
MODEL: A-2 Stowaway.

DESCRIPTION: The Stowaway—which is available in Btu-inputs of 84,000, 112,000 and 140,000—comes in two "erected" packages. The heating section which is in one package is 23 in. high and 50 in. long, while the blower section is built to fit snugly up

HAYS®

TAMPER-PROOF GAS STOPS

FEATURES



- Positive Tamper-Proof and Vandal-Proof Design.
- Non-Removable Plug—with Constant Spring Tension for 125# Working Pressure.
- Extra Grade Gray Iron Body, Gas Service Bronze Plug.
- Tough Stainless Steel Spring—Strong Steel Washer, Retains Plug in Body.
- Heavy Bronze Bead, Hardened—Holds Steel Washer to Bottom of Plug.
- All Assembly Parts Recessed and Inaccessible within Iron Body—Gripless and Shearless.
- Precision Ground Plug and Body—Matched for Perfect Seating.
- Lubricated with a Compound of Greases—Suitable for Use with Manufactured, Natural or Liquid Petroleum Gases.
- Spring Tension Allows Free Turning and Reseating of Plug in Body.
- Individually Tested Under Rigidly Controlled Inspection.
- Flow Way Equal to Rated Capacity of Domestic Consumer Meters.
- Obtainable in a Variety of Patterns.

Write for Folder 120-C

AVAILABLE IN

Black or Galvanized

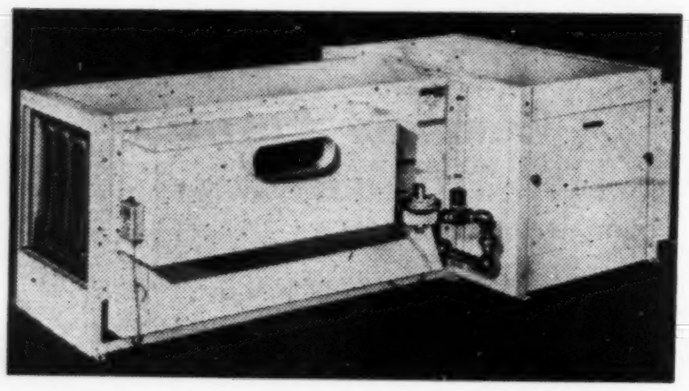
Flat Head Less Check
Flat Head With Check
Flat Head With Lock-Wing

Sizes; ¾"—1"—1¼"—1½"—2"

Also HAYS STANDARD
HEAVY PATTERN IRON BODY GAS STOP

For 75 Years the Gas Industry has relied on HAYS Iron Body Gas Stops

against either end of the heating section or, because of dual AGA approval as both a central furnace and a duct heater, the blower



may be installed remote from the heater.

The Stowaway features a new heat exchanger design with its streamlined "tear drop" shaped flue gas passages, the manufacturer says.

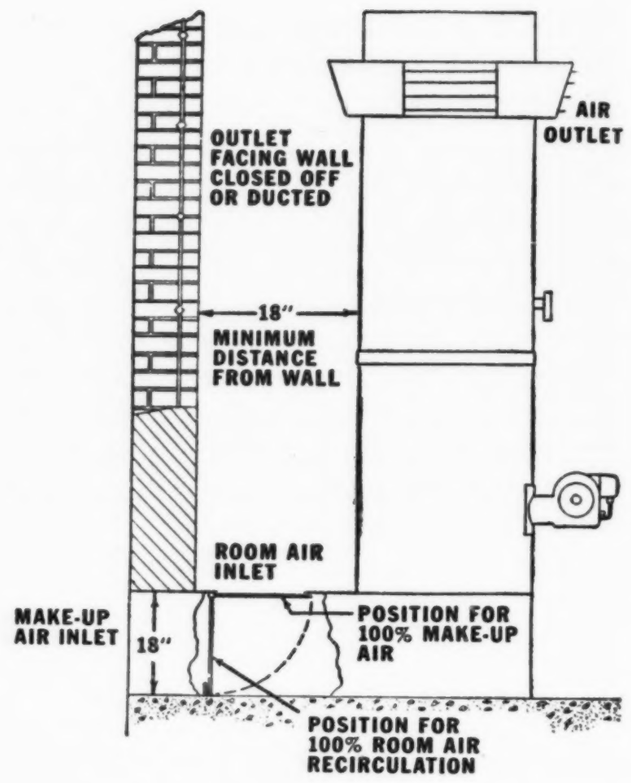
Tempering Unit

PRAT-DANIEL CORP., East Port Chester, Conn.

MODEL: Thermobloc.

APPLICATION: For tempering make-up air in buildings where a ventilating system imposes heavy loads on the heating plant in cold weather.

DESCRIPTION: When ventilators are at work, the manufacturer states, air to make up for the volume ventilated off must enter the building. Thermobloc units are positioned along the walls, with air intake duct running through the wall. This feeds outside air to the units where its temperature is raised the desired number of degrees before it is discharged into the working area. The Thermobloc can temper make-up air whether it is used as a plant heating system or as an auxiliary unit.

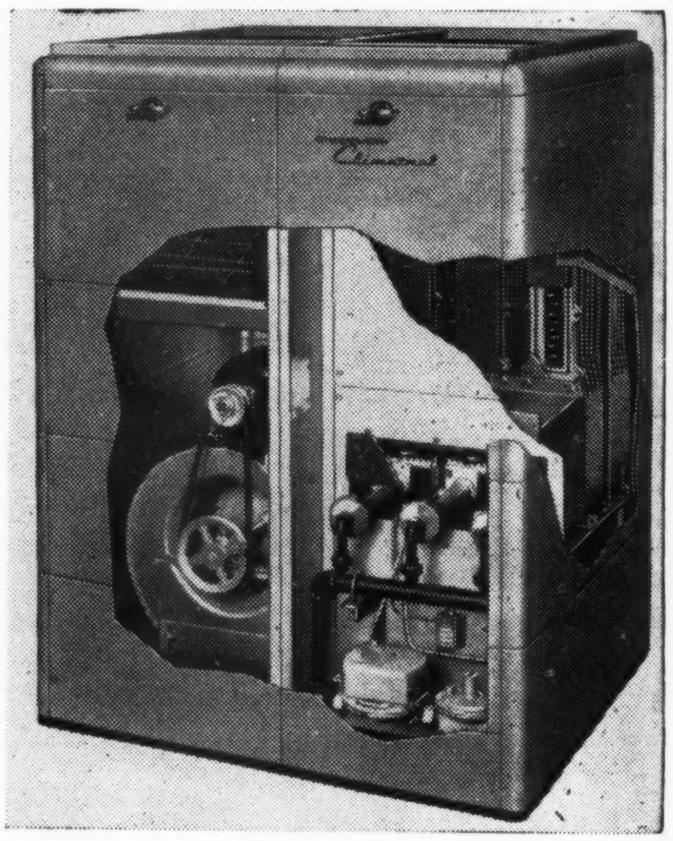


Air Conditioner

L. J. MUELLER FURNACE CO., Milwaukee, Wis.

MODEL: Climatrol Type 108 gas-fired winter air conditioner.

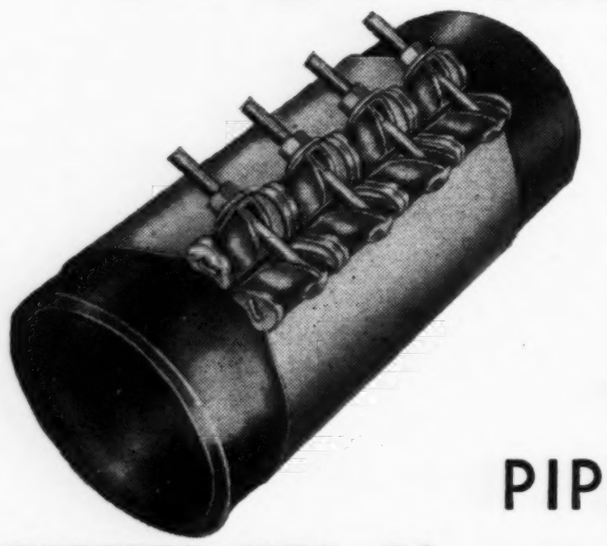
DESCRIPTION: This cast iron low-boy unit can be installed with the blower compartment at either the right or left side of the heat exchanger. It is available in six sizes with inputs ranging from 67,500 to 157,000 Btu. Approved by the AGA for operation



with natural, mixed and manufactured gases, it is also suited for high altitude installation at full rating. Outstanding design feature of the Type 108 is the sectional heat exchanger. Each section is a durable, corrosion-resistant, chrome alloy casting of one-piece construction.

A compact cooling section, especially designed for the Type 108 and finished in the same way, may be placed between the heat exchanger and blower compartments, providing year 'round air conditioning. The entire conditioner may be installed at one time or cooling may be added at any time.

STOP THAT LEAK!



the FAST and EASY way with STAUFFER PIPE REPAIR CLAMPS

STAUFFER MFG. CO. 8424 OTIS ST., SOUTH GATE, CALIF.

NORWALK DISC TYPE CHECK VALVE

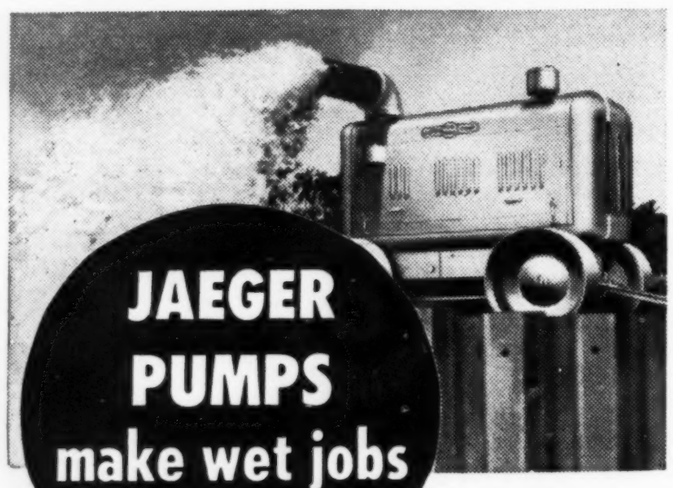
Flanged and Fabricated in Steel

For *GAS* and *AIR*— *LOW* and *HIGH PRESSURES*

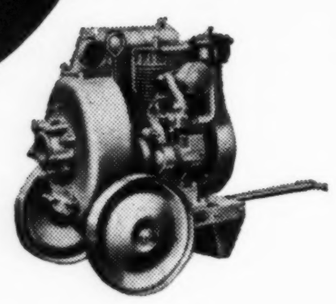
Can be supplied for use with any pressures. Easily lubricated through grease fitting. Indicator shows position of disc. Can be counter balanced for vertical jobs. Dash pot can be installed to prevent chattering when passing high velocity gas or air.

NORWALK VALVE CO.
South Norwalk, Conn.

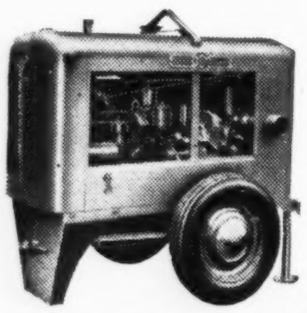
New 2" aluminum pump weighs 105 lbs., pumps 9000 gph . . . Gives high head performance for price of low head pump.



JAEGER PUMPS make wet jobs dry

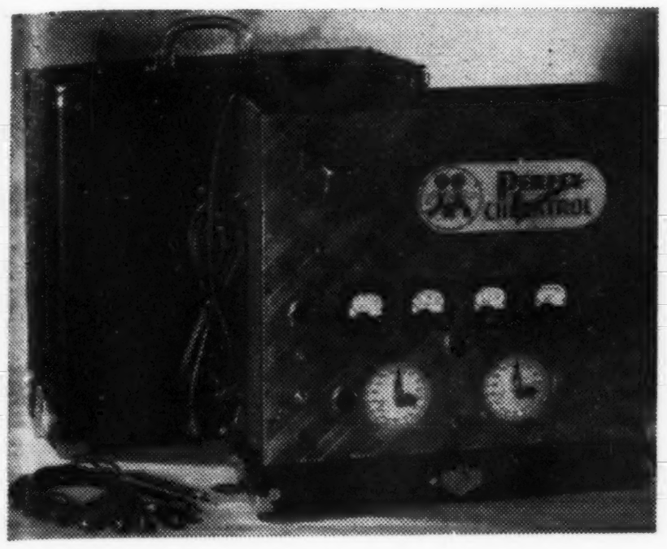


Extra power and double priming action to dewater faster. Built to outlast cheaper pumps by thousands of hours.



Heavy duty 2" to 10" models for low or high head requirements. Super-Jet pumps for pressures to 275 lbs. Diaphragm and caisson pumps. Get catalog.

THE JAEGER MACHINE COMPANY
Columbus 16, Ohio



THE PERFEX CORP., 500 W. Oklahoma Ave., Milwaukee, Wis., has introduced the "Checktrol," a portable control tester. The unit will enable distributors and dealers to provide their customers with a fast, accurate means of checking the operation of domestic heating controls, thus eliminating the necessity of returning for repair or replacement any but actually defective controls. According to Idwal Parri, Perfex service manager, a high percentage of controls now returned to the factory are found to be without defect.

CURRENT READING

FUELS — THEIR PRESENT and Future Utilization—by W. M. Holaday, R. E. Albright, T. L. Apjohn, and L. R. Steffens. This paper was presented to a group session of "Fuels of the Future" during the annual meeting of the American Petroleum Institute in Chicago on Nov. 10.

This paper points out that less than a third of the energy consumed in this country is used effectively. The authors suggest changes in fuel utilization on the bases of reserves and efficiency of utilization.

According to these authors, energy is derived principally in this country from three primary sources, viz.: coal, petroleum, and natural gas; other sources such as water power and wood supply about 10%. Petroleum and natural gas together account for about 50%. Coal supplies the largest portion of the demand for industrial power and heat.

Transportation requirements, amounting to 36% of this country's net energy requirements, appear to be subject to the greatest reduction through improvements in utilization efficiency. Automotive equipment offers the most fertile field in this area, inasmuch as the weighted overall efficiency under normal operating conditions is only 6%.

One manner of increasing automotive efficiency perhaps is by raising compression ratio in engines, although almost doubling the present ratio of 6.7 would increase the overall average efficiency by only 2 percentage points. However, additional energy would be required to produce a corresponding increase in the required octane-number rating of gasoline. Alternates are supercharging, applied in several ways, and automatic transmissions.

These authors conclude that, if a petroleum shortage should occur in the future, the use of petroleum could be curtailed in fields where other fuels can provide similar performance with little or no loss in efficiency. Thus liquid-fuel resources can be conserved for future applications where no suitable substitute is likely to become available.

Simultaneously, improvement in utilization efficiencies in all applications is desirable. The need is particularly pressing in the transportation field.

THE USE OF AMMONIA in Control of Vapor-Zone Corrosion of Storage Tanks—by F. T. Gardner, A. T. Clothier, and F. Coryell. This paper was presented to a pipeline symposium during the annual meeting of the American Petroleum Institute in Chicago on Nov. 8. The following paragraphs summarize the paper.

Laboratory studies have shown that ammonia in concentrations as low as 0.4% in systems containing 2% hydrogen sulfide by volume is effective in controlling vapor-zone corrosion. Results of experimental field work with 55,000-bbl tanks showed that the efficiency of protection gradually increased from 16% when an inhibitor injection rate of 1.4 lb per tank per day was employed to almost complete protection when 12 lb to 15 lb per day were added to the tank vaporzone. The uninhibited corrosion rate measured simultaneously in tanks in similar service averaged 273 milligrams per square decimeter per day or 0.053 inches per year for the entire test period.

The Interstate Oil Pipe Line Co. is now using ammonia in treating eight tanks at three pipeline stations. Three tanks at Magnolia station in southern Arkansas and two at Moore station in northern Louisiana are receiving ammonia from bulk storage. The three remaining tanks under treatment are at the Yellowstone station near Billings, Mont. Ammonia usage is economical, and is equally effective in both areas despite the great differences in climatic conditions.

HEATH

Leak Location

SERVICE

can help assure you of a

PROSPEROUS 1950

by locating that Lost Gas that never reaches your customers' meters.

WRITE

WIRE *PHONE*

HEATH

TREE SERVICE INC.

WELLESLEY, MASS.

CLIP THIS AND MAIL TODAY

IF YOU ARE NOT A REGULAR SUBSCRIBER TO GAS

In GAS each month you will find dozens of ideas that will help you know your business better and do your job better. Just one of these ideas coming to you on our pages can pay you many, many times the small cost of a subscription.

GAS 198 SOUTH ALVARADO ST.
LOS ANGELES 4, CALIFORNIA

Standard rates apply to U. S. and Possessions, Canada, Mexico, Cuba, South and Central American Countries.

Please enter my subscription to GAS for . . .

All Others—1 Year $3 ☐

1 YEAR $2.00 ☐ 2 YEARS $3.50 ☐ 3 YEARS $5.00 ☐

☐ Check is enclosed ☐ Please bill me

NAME_____ POSITION_____

COMPANY_____

_____

STREET CITY ZONE STATE

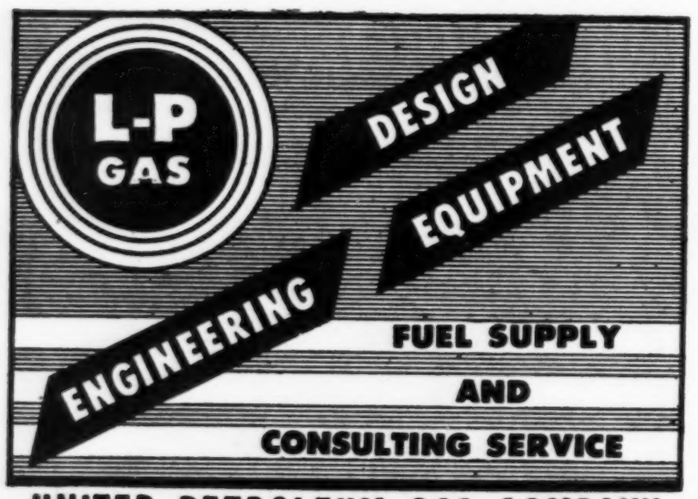
GAS CLASSIFIED

Classified advertising is set in 6-point type, without border or display, at the rate of 15 cents per word per insertion; minimum charge per insertion $3. Box numbers for replies count as 5 words. Count as a word each one letter word and each group of figures. Classified advertising is only accepted when payment accompanies order. Copy and payment must reach publisher's office prior to 10th of month preceding publication.

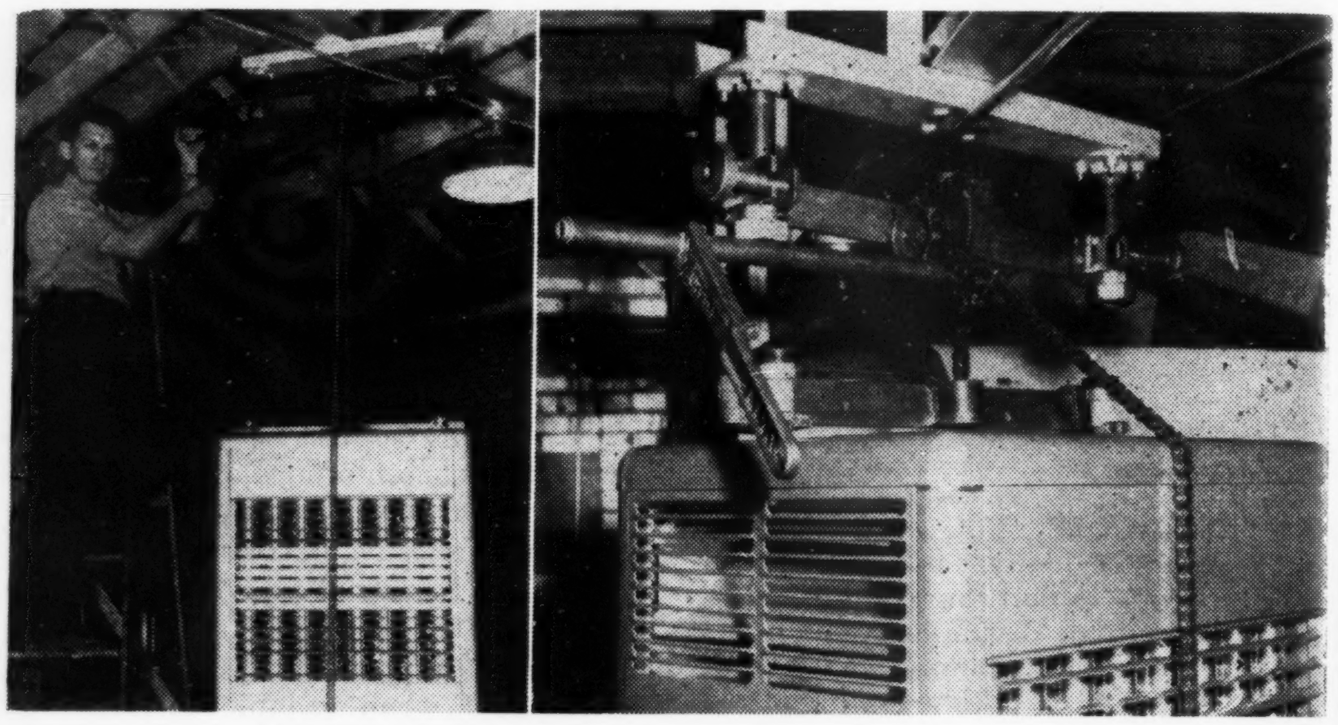
LP-GAS SPECIALISTS—100% PLANTS—STAND-by—Enrichment—Peak Shaving. Twenty years experience. H. Emerson Thomas and Associates Inc., Westfield, New Jersey.

WANTED: USED CUTLER-HAMMER RECORDING Calorimeter or Thermeter. Illinois Electric & Gas Company, Murphysboro, Illinois.

WANTED: EXPERIENCED GAS CONVERSION executive to take complete charge of Survey & Conversion Division of National Corporation. Position offers attractive opportunity to capable gas man able to direct small and large gas conversion jobs. Address Box 25, GAS, 198 S. Alvarado St., Los Angeles 4, Calif.



UNITED PETROLEUM GAS COMPANY
806 ANDRUS BLDG., MINNEAPOLIS 2, MINN.



DENVER FOREMAN DESIGNS HEATER HOIST

Installation of gas-fired unit heaters, a difficult and exacting work, has been greatly simplified through use of a heavy duty hoist designed and constructed by the Denver gas shop department of Public Service Co. of Colorado. Replacing block and tackle, scaffolding, and other earlier means of raising the heater into position, the hoist decreases installation labor and equipment and reduces danger of injury and property damage.

The hoist consists of a top cross bar which fastens to the ceiling drops to which the heater is to be attached, a Yale ratchet lift and a bottom cross bar which is secured to the support brackets of the heater. A roller chain, swivel connected to the center of the bottom bar, raises the heater into position by operation of the ratchet lift.

Design of the hoist is such that it can be used where clearance between top of unit heater and ceiling is as little as 8 in. Weight of the top cross bar and ratchet lift, which must be raised manually and clamped to the ceiling drops, is only 39 lb and can be attached by one man. Swivel connection between roller chain and bottom cross bar permits the heater to be turned while being raised, to clear show cases or other obstructions, and to be easily swung into final position for connection. The hoist has a capacity of 1500 lb.

Carl Lipperd, gas shop foreman, designed and constructed the hoist. As a result of the satisfactory performance of this equipment, he received an award of $100.

THE CORROSION OF Mild Steel by the Products of Combustion of Gaseous Fuels—Battelle Memorial Institute, Columbus, Ohio. This is the second report on project DGR-4-CH sponsored by the AGA committee on domestic gas research. The project, which is under the immediate direction of the technical advisory group for central space heating research, has as its broad objective the study of the various factors influencing the corrosion behavior of metals and materials in the presence of the combustion products of fuel gases by the use of test procedures clearly simulating operating conditions.

The data reveal the following conclusions with respect to the corrosion of mild steel by flue gas under the conditions studied:

1. The well-known effect of sulfur on the corrosiveness of combustion products of fuel gas can readily be seen under continuous condensation (80°F) conditions or cyclic operation. Increasing the sulfur content increases corrosion rates.
2. It is evident that the corrosion rate is a function of time. Corrosion rates determined for short exposure times are quite different from those experienced over a longer exposure period. This is particularly true for the cyclic and continuous condensation tests. The rate of penetration decreases markedly as the time of exposure increases up to between 100 and 200 hours and then reaches an essentially constant value.
3. Under either continuous condensation (80°F) or cyclic operation (26-minute cycle), increasing the sulfur content from 0.0 grain to 5.0 grains has a decidedly more marked effect on corrosion rates than an increase from 5.0 to 50.0 grains.
4. Under cyclic operation (26-minute cycle), the upper temperature limit appears to have little effect on corrosion rates for a given sulfur content. This is particularly true at sulfur contents above 10.0 grains.
5. Under continuous heating at temperatures above the dew point (200°-400°F), little or no effect can be noted on the corrosiveness of the flue gas by the addition of sulfur up to 50.0 grains.
6. Cyclic operation (26-minute cycle, 7-minute heating, 19-minute cooling) under the various temperature conditions is only slightly more severe with respect to corrosion than continuous condensation (80°F) for the same sulfur content of fuel gas, but is definitely a much more severely corrosive condition than continuous heating at temperatures above the dew point.
7. Continuous condensation (80°F) is a more corrosive condition than continuous heating for temperatures up to 600°F. In fact, continuous condensation (80°F) at 0.0 grain sulfur resulted in an average penetration rate in mils per year of 11.4 and, at 50.0 grains, a rate of approximately 45.0 mils, while continuous heating at 400°F in the presence of 50.0 grains sulfur gave a rate of only 0.1 mil per year, and at 600°F and 0.0 grain sulfur a rate of 2.0 mils per year.
8. Comparison of the results of the 53-minute (7-minute heating, 46-minute cooling), 26-minute (7-minute heating, 19-minute cooling), and the 13-minute (7-minute heating, 6-minute cooling) cycles seems to indicate that the frequency of cycle is as important a factor in determining corrosion behavior as temperature or sulfur content. For a given temperature and sulfur level, the 13-minute test cycle gave lower corrosion rates than either the 26-minute or 53-minute test cycle.

The report may be purchased from AGA headquarters for 75 cents a copy.

1949—Boom Year For Gas Pipelines

...4302 miles of gas pipeline went underground in the last year, and the Super and Toughest Inches came into being...

FIGURES like 1000 miles, $75 million, 50,000 compressor hp, 300 MMcf were rolling gliby off the tongues of blase pipeliners in 1949, as one of the greatest years in all pipelining history drew to a close.

It was a year of superlatives. The Little, Big, and Biggest Inch were pushed into the background of the news as the Super Inch, all 34 in. of it, started creeping south from San Francisco in search of west Texas gas—or as super-sized equipment tore along an 1800-mile track, chewing up earth and tamping pipe into place for a giant line running from Texas to New York City.

Other lines were going into operation —Mississippi River Fuel's pipeline to St. Louis, a takeoff from the Big Inch to Staten Island, Michigan - Wisconsin's major carrier from the fields of the Southwest to the north country, and San Diego's new lateral from the Biggest Inch were a few.

The Toughest Inch

The first phase of at least two major lines was begun and completed within the one year—the Columbia Gas System's West Virginia-Maryland line, a 262-mile "Toughest Inch" which will eventually serve Washington and Baltimore, and Texas Gas Transmission Corp.'s 833-mile Texas-to-Ohio span. With the exception of 63 miles between Lula, Miss., and Memphis, Tenn., and some 33 miles to be completed in January, the entire Texas Gas line was laid during the single year. It was scheduled to go into operation as far as Louisville, Ky., Dec. 20 and on the line as far as the northeastern terminus, Middletown, Ohio, by Jan. 1. Customers in Tennessee, Kentucky, Illinois, Mississippi, Louisiana, and Arkansas will benefit, with deliveries set at 304 MMcf per day initially and reaching 400 MMcf by mid-1950.

The Federal Power Commission, meanwhile, was assuring plenty of work for pipeliners in months and years ahead. During the year, according to *GAS* statisticians working with material made available by the commission, 6474 miles of major pipeline work was authorized. The total cost of all these projects ran over $556 million.

Only Final Authorizations

And these figures include only projects given final authorization. Many other temporary permits were issued during the 12 months.

(A table compiled from this FPC data appears on pp. 80, 82 and 83.)

Looking ahead to 1950, we find the prospects excellent for another banner year not only in completing projects under way and building new ones for which authorization has recently been given, but also for possible new approvals. Applications for new, significant, and expensive lines are being pushed as the new year comes in. Three important sectors of the United States are still clamoring for the natural gas that they have been so long denied: the Northwest, New England, and the Southeast. Northwest lines must wait on the pleasure of many governmental officials and conflicting interests. The province of Alberta, whence the gas would flow to Seattle and Portland, Ore., must be satisfied that there is a plentiful supply of gas for home consumption. This may take time, but if U. S. exploration experience is any criterion, the approval of at least one line would appear to be an eventual certainty.

New England Served

At this date, it also appears a certainty that New England will be served—and perhaps within the very near future. A certification may well come in 1950. And in the Southwest, hearings are still under way on the several applications now before the FPC.

And, of course, New York City will begin receiving natural gas in 1950.

Back once again to 1949, in review . . .

In his year-end report, AGA President Hugh Cuthrell revealed that at this time 8500 miles of pipeline are under construction, with applications hanging fire calling for 14,600 additional miles. The aggregate length of all pipelines now in operation exceeds 260,000 miles, through which 3 trillion cu ft of gas pass annually.

Gas pipeline companies this month are reporting in *GAS* the progress made for the entire year, and their individual accomplishments are listed in the Pipeline Progress Reports on pp. 94-96. Twenty-two of the outstanding companies are participating in this review, and their total mileage figures look something like this:

Total miles of pipeline included in projects under construction in 1949, 7167 miles.

Total miles of pipeline actually laid in 1949, 4302 miles.

PIPELINE PROJECTS AUTHORIZED BY FPC IN 1949

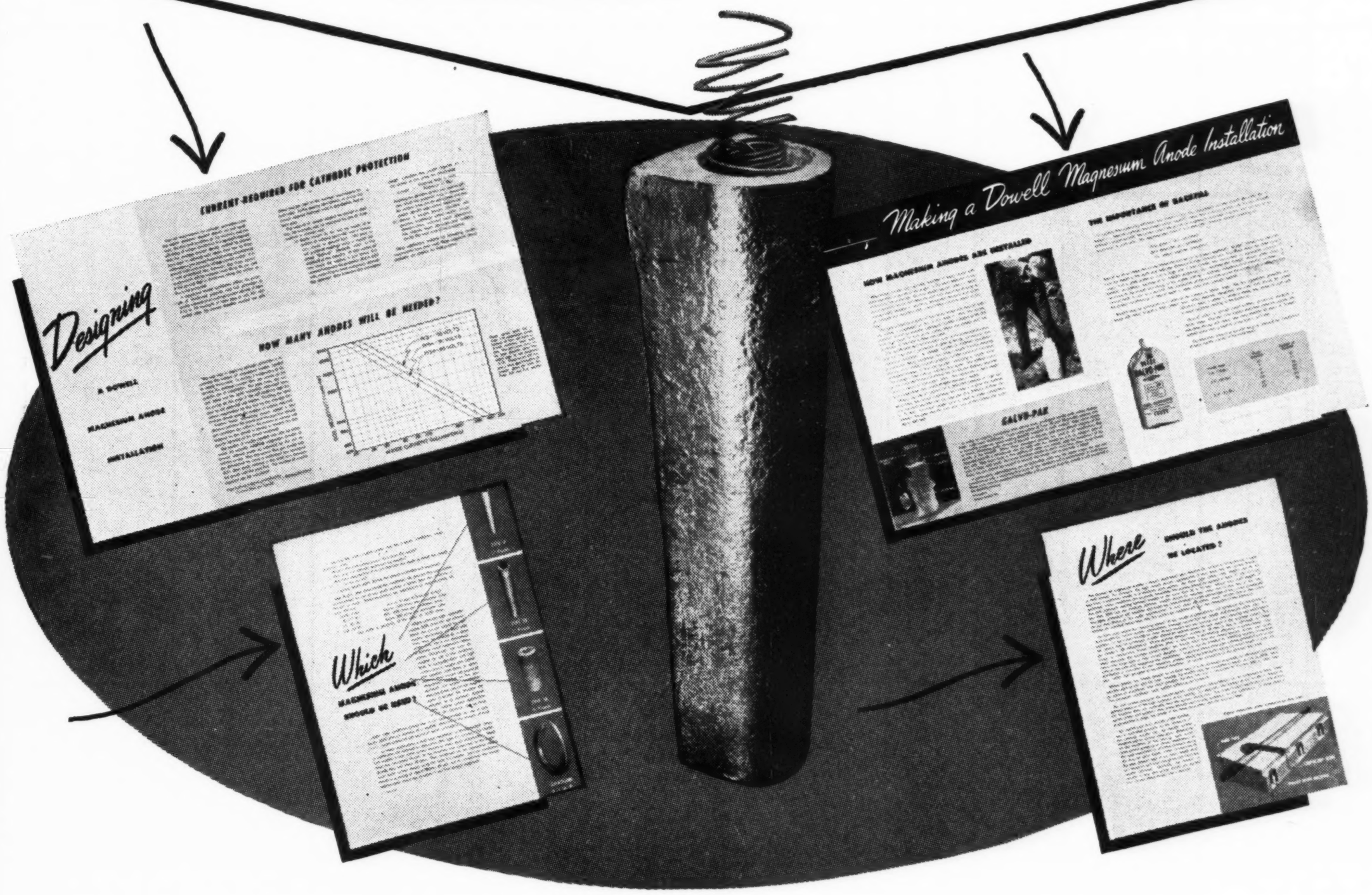
Date	Applicant	Description	Purpose	Estimated Cost	Communities Benefited (50,000 or more population)
Jan. 27	Atlantic Seaboard Corp. Virginia Gas Transmission Corp.	268 miles of 26-in. pipeline from Clendenin, W. Va., to Rockville, Md.; multiple crossing of Potomac near Rockville and regulating and measuring equipment.	To improve service to existing markets.	$ 20,000,000	Washington, D. C.; Baltimore, Md.; Arlington county, Va.
Feb. 18 July 27	Texas Eastern Transmission Corp.	For 87,800 hp at compressor stations along Inch lines; 75 miles of feeder lines to Louisiana and Texas gas fields.	To increase capacities of Big and Little Inch lines to 508 MMcf daily.	$ 11,835,200	Atlantic City, Bayonne, Camden, Newark, Irvington, Jersey City, Passaic, Paterson, Trenton, N. J.; Syracuse, Rochester, Buffalo, New York City (Staten Island), N. Y.; Akron, Canton, Cleveland, Lakewood, Youngstown, Ohio; Pittsburgh, York, Erie, Altoona, Johnstown, Pa.
March 1	El Paso Natural Gas Co. Pacific Gas & Electric Co.	*El Paso:* 247 miles of 30- and 26-in. line looping existing 26-in. line from Permian basin; 95 miles of 24-in. line in Texas; 102 miles of 26-in. line and 17 miles of 30-in. line from Gila (Ariz.) compressor station to Colorado river near Needles (Calif.); 80,000 additional compressor capacity; additional field lines and equipment. *PG&E:* 506 miles of 34-in. line from California border to Milpitas; 16,800 additional compressor hp; lateral lines.	To make available to consumer markets gas that would otherwise be flared.	$100,000,000	Berkeley, Fresno, Oakland, Sacramento, San Francisco, San Jose, Stockton, Calif.
March 31	Texas Gas Transmission Corp Texas Eastern Transmission Corp.	*Texas Gas:* 723 miles of 26-in. line from Lisbon field, La., to Middletown, Ohio; 110 miles of 20-in. line from Carthage field to Lisbon; 32 miles of lateral from Madisonville to Evansville, Ind.; 10 compressor stations with initial capacity of 68,800 hp. *Texas Eastern:* 177 miles of 26-in. line from Middletown east; 100-mile extension of Little Big Inch line in Texas; 36 miles of loop between Caston and Lisbon, La.; additional compressor facilities.	To bring Texas and Louisiana gas to companies in Kentucky, Tennessee, Indiana, Ohio, and Pennsylvania.	$ 73,500,000	Terre Haute, Evansville, Ind.; Louisville, Ky.; Syracuse, Rochester, Binghamton, Buffalo, N. Y.; Akron, Canton, Cleveland, Lakewood, Columbus, Youngstown, Springfield, Dayton, Toledo, Hamilton, Cincinnati, Ohio; Pittsburgh, York, Erie, Philadelphia, Chester, McKeesport, Altoona, Johnstown, Reading, Allentown, Bethlehem, Harrisburg, Pa.; Memphis, Tenn.; Charleston, Huntington, Wheeling, W. Va.
April 29	Trunkline Gas Supply Co.	711 miles of 26-in. main line; 816 miles of lateral supply line from the Gulf Coast to Edge, Texas, and Palmyra, Neb.; seven compressor stations, 44,800 hp capacity.	To supply 250 MMcf daily to Northern Natural Gas Co. for resale in Nebraska, Iowa, Minnesota, and South Dakota.	$ 84,340,300	Des Moines, Sioux City, Iowa; Minneapolis, Minn.; Lincoln, Omaha, Neb.
May 3	East Tennessee Natural Gas Co. Tennessee Gas Transmission Co.	*Tennessee Gas:* 155 miles of 30-in. loop between central Louisiana and northern Tennessee; additional compressor facilities. *East Tennessee:* 172 miles of 22-in. line from TGT's line to Oak Ridge, Tenn.	To supply natural gas to the U. S. atomic energy plant, Oak Ridge.	$ 23,400,000	Oak Ridge, Tenn.
May 4	Cities Service Gas Co.	For compressor facilities aggregating 4790 hp along company's Hugoton to Kansas City line.	To improve gas service in the Kansas City area.	$ 1,214,000	Kansas City, Wichita, Topeka, Kan.; Kansas City, St. Joseph, Mo.

Do
cost
buri
is a
form
nesi
sion
othe
will
T

DOWELL
MAGNESIUM ANODES

Help you control corrosion of underground metal

Free booklet tells you how!



Do you have all the facts on this low-cost, effective means of protecting buried metal against corrosion? Here is a new booklet filled with basic information on the use of Dowell magnesium anodes for control of corrosion on pipe lines, tank bottoms, and other types of buried metal.

This 16 page illustrated booklet will give you the fundamentals of the use, design and installation of effective magnesium anode installations. It explains how to calculate adequate current requirements, the number of anodes required, and the type anodes to use. Other points covered are how to locate the anodes for maximum effectiveness and the recommended procedure for installation.

Included in the booklet are typical case histories showing the results obtained when Dowell magnesium anodes were used to control underground corrosion. A study of these case histories will explain why so many leading businesses and municipalities are using Dowell magnesium anodes to protect their underground installations against costly losses due to corrosion.

Dowell Incorporated, Dept. 300-6
Tulsa 3, Oklahoma

Please send me a copy of your free booklet "Dowell Magnesium Anodes."

Name_____

Title_____ Firm _____

Address_____

Look to **DOWELL**

MAGNESIUM ANODES FOR CORROSION CONTROL

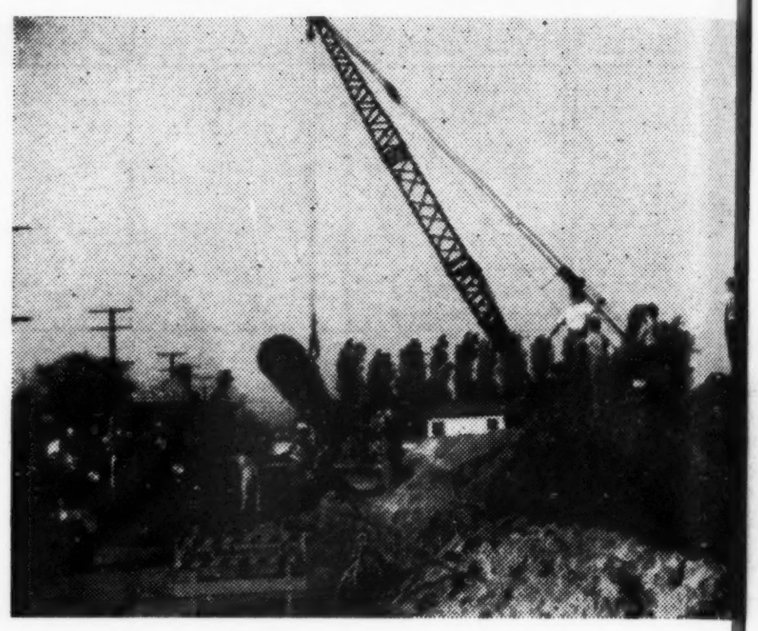
Date	Applicant	Description	Purpose	Estimated Cost	Communities Benefited (50,000 or more population)
May 25	San Diego Gas & Electric Co. Southern Counties	*SD:* 50 miles of line in San Diego county connecting with a 25-mile Southern Counties line in Riverside county.	To bring an additional 40 MMcf to the San Diego area daily.	$ 4,969,000	San Diego, Calif.
May 26	Home Gas Co. Eastern Pipeline Co.	Removal and abandonment of lines in New Jersey by Eastern; 24 miles of 12-in., 28 miles of 10-in., and 18 miles of 8-in. line in Sullivan and Rockland counties (N. Y.) by Home.	To provide a 30-MMcf daily increase in Home capacity.	$ 2,656,000	Binghamton, N. Y.
June 15	Ohio Fuel Gas Co.	85.5 miles of gas pipeline in central Ohio, for replacement of 84.1 miles of line to be retired.	To retire old line.	$ 3,239,720	Columbus, Springfield, Dayton, Toledo, Hamilton, Cincinnati, Ohio.
June 23	Mountain Fuel Supply Co.	32 miles of 20-in. line to parallel an existing 16-in. line from Coalsville to Salt Lake City.	To increase deliveries to the Salt Lake valley by 23.6 MMcf daily.	$ 1,750,000	Salt Lake City, Utah.
June 22	United Fuel Gas Co.	35 miles of transmission line from 4½-in. to 24-in., and a storage compressor station with 1480 hp in West Virginia.	To allow injection of natural gas in company storage pools and to meet increased peak load demands.	$ 1,251,400	Binghamton, Buffalo, N. Y.; Columbus, Springfield, Dayton, Toledo, Hamilton, Cincinnati, Ohio; Pittsburgh, York, Erie, Pa.; Charleston, Huntington, Wheeling, W. Va.
June 28	Central Kentucky Natural Gas Co.	23 miles of loop between Menifee and Mt. Sterling, Ky.; 12,500 ft of line from Tennessee Gas Transmission measuring station at South Means, Ky. to Menifee, and six compressor units.	To increase deliveries to central Kentucky and to Cincinnati, Ohio.	$ 1,643,200	Covington, Lexington, Ky.; Cincinnati, Ohio.
July 27	Chicago District Pipeline Co.	For a liquefaction plant with storage capacity of 400 MMcf and facilities for liquefying 4 MMcf daily and regasification of 6 MMcf per hour.	To facilitate meeting of peak load requirements.	$ 6,000,000	Chicago, Ill.
July 29	Tennessee Gas Transmission Co.	450 miles of mainline loops along the company's system; 395 miles of 26-in. main line from northeast Kentucky through Ohio and Pennsylvania to Buffalo, N. Y.; 325 miles of lateral lines; 79,800 hp in compressor units.	To increase company's capacity to more than one billion cu ft and extend line to Buffalo, N. Y.	$ 90,000,000	Cleveland, Ohio; Pittsburgh, Pa.; Buffalo, N. Y.
July 29	Kansas-Nebraska Natural Gas Co.	14 town-border measuring stations and 301 miles of main, laterals, and loop lines, and to install 3600 hp in compressor stations. Also purchase 15 miles from Nebraska Natural Gas Co.	To meet increased demands of existing markets.	$ 2,339,457	
Aug. 2	Michigan-Wisconsin Pipeline Co. Michigan Consolidated Gas.	*Mich.-Wis.:* 24-in. pipe instead of 26-in. between Hugoton, Tex. and Millbrook, Ill.; increase in compressor hp from 15,600 to 21,600. *Mich. Con.:* Miscellaneous facilities.	To increase capacity of Texas-Michigan line by 27 MMcf daily.	$ 91,438,000	Detroit, Mich.

GAS—January, 1950

Date	Applicant	Description	Purpose	Estimated Cost	Communities Benefited (50,000 or more population)
Sept. 1	Southern Natural Gas Co.	38 miles of branch loop lines; submarine crossings of Warrior and Chattahoochee rivers; a 7.4-mile extension of a branch line to serve Southern Cement Co. (Shelby county, Ala.)	To increase capacity of branch lines.	$ 1,226,070	Columbus, Ga.
Sept. 13	Colorado Interstate Gas Co.	38 miles of 20-in. loop on Hugoton-Denver line; three 1200-hp compressor units in the Hugoton field; an 8400-hp compressor station at Kit Carson, Colo.	To increase daily capacity by 62 MMcf.	$ 4,328,930	Colorado Springs, Pueblo, Colo.
Sept. 16	Arkansas-Louisiana Gas Co.	72-mile line with capacity of 200 MMcf daily from Harrison county, Texas, to Columbia county, Ark.; a 90.8-mile from there to Perla, Ark.	To expand service.	$ 7,618,500	
Sept. 29	Jersey Central Light & Power Co.	39.4 miles of line connecting the company's coastal system with the Big Inch line.	To expand service in New Jersey.	$ 1,208,200	Monmouth and Ocean counties, N. J.
Sept. 29	Ohio Fuel Gas Co.	For conversion of six natural gas producing pools in Medina, Richland, Rocking, and Lorain counties to storage service; 59.8 miles of pipeline.	To expand company's underground storage facilities by 16.6 billion cu ft.	$ 1,090,975	
Oct. 28	United Gas Pipe Line Co.	26 miles of pipeline to connect the company's system in east Texas with the gas fields of Cameron parish, Louisiana.	To add 112 MMcf to the company's daily capacity.	$ 1,792,000	Beaumont-Port Arthur, Texas.
Oct. 31	Consolidated Edison Co. New York Brooklyn Union Gas Co. Kings County Lighting Co.	*ConEd:* 23 miles of line. *Brooklyn:* 12 miles of line. *Kings County:* 2.9 miles of line.	To deliver gas from Transcontinental Gas Pipe Line's Texas-New York line.	$ 12,723,000	New York City.
Nov. 16	East Tennessee Natural Gas Co.	18 miles of line in the Knoxville (Tenn.) area.	To expedite previously authorized service.	$ 875,900	Knoxville, Tenn.
Nov. 25	Alabama-Tennessee Natural Gas Co.	35.5 miles of 8⅝-in. line in place of 6⅝-in. line; 2.7 miles of 10-in. line and 3.8 miles of 8-in. lines to TVA installations in Muscle Shoals, Ala.; 10.6 miles of 4-in. and 23.1 miles of 3-in. lateral lines; 2.74 miles 4½-in. line to Decatur, Ala.	To allow use of aluminum pipe on a 9500-ft section, and to modify previous authority.	$ 4,081,500	
Dec. 1	Central Hudson Gas & Electric Co. Home Gas Co.	*Central Hudson:* 40 miles of line to carry gas to Dutchess, Orange and Ulster counties, N. Y. *Home Gas:* metering and regulating station, Tuxedo, N. Y.	To expand service.	$ 1,700,000	

PUBLIC RELATIONS

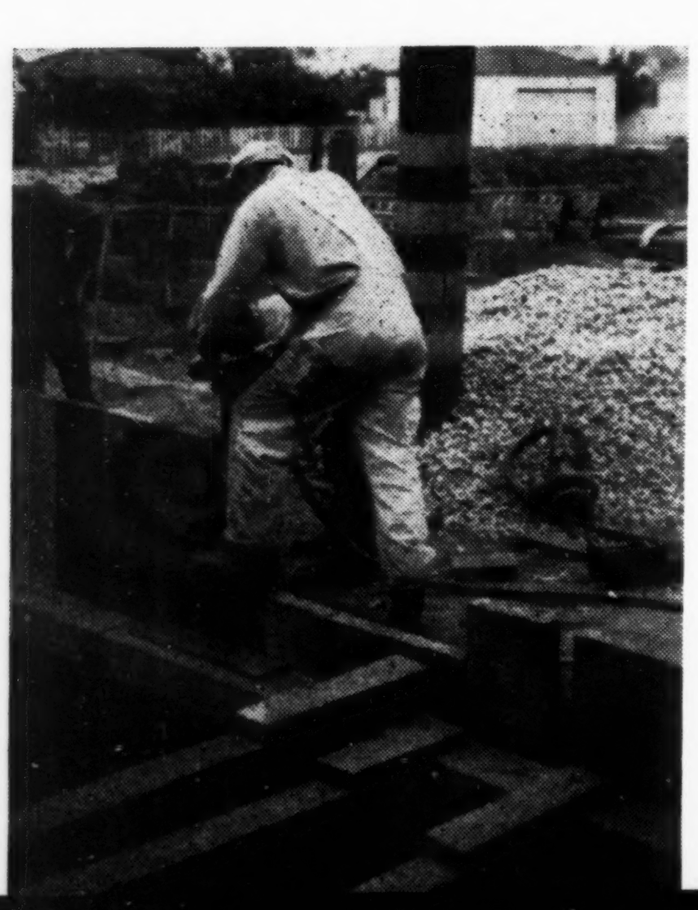
ON THE PIPELINE



TOP LEFT: Champion sidewalk superintendents. At the time the photo was taken, the gentleman seated had spent two weeks beside the trench. He always carried his chair along. ABOVE: Interested spectators—but they kept a respectful distance.

This is the story of an unusual job of public relations performed by the Southern California Gas Co. during the five-month task of laying a transmission line from a point on the Rivera-Pasadena take-off of the Texas-to-California line to a metering station being built at 104th street and Crenshaw boulevard, in the fast-growing southwest section of Los Angeles. The line will serve beach cities and neighboring communities and will also connect with an 18-in. and 20-in. line running south from the Goleta storage field near Santa Barbara. In off-peak seasons, Texas gas will thus be injected into the California fields for winter withdrawal.

The line was laid in two spreads, one taking off from the western terminus and one from the eastern link. The two spreads were joined in August and in November the metering station was being installed. In keeping with the efforts to further public relations, the metering installation was set underground. The area is to be landscaped to present a pleasing addition to this section.



WORKMAN operates portable pile driver used to erect sidewalks on ditch.

By BILL CLARK

SHOULD you happen to query the average householder about that excavation lying open across the street, he'll quite likely shrug his shoulders and opine that the city or the gas company or maybe the street department is tearing up things—as usual. He'll probably add that it's happening all the time—and it's a damned nuisance, too.

Exclusive

Not so the citizen of Los Angeles, if he lives along the route of Southern California Gas Co.'s new Rivera-Crenshaw line. Likely as not, he knows how much gas it carries, where the gas comes from and why and—if he's the garrulous type—considerably more than you'd be interested in hearing. You may note a touch of pride in his voice, because he has that sense of "belonging," of being a part of the tremendous task of laying a 30-in. transmission pipeline.

All this is the result of the big utility's broadening program of enlightened public relations. In this company, as in many other modern utilities, "PR" doesn't stop with the planting of so many stories per month in the metropolitan newspapers, or of getting so many mentions in so many editions. It reaches farther down into the daily lives of the people it serves, helping to remove the inborn distrust of big business and corporations.

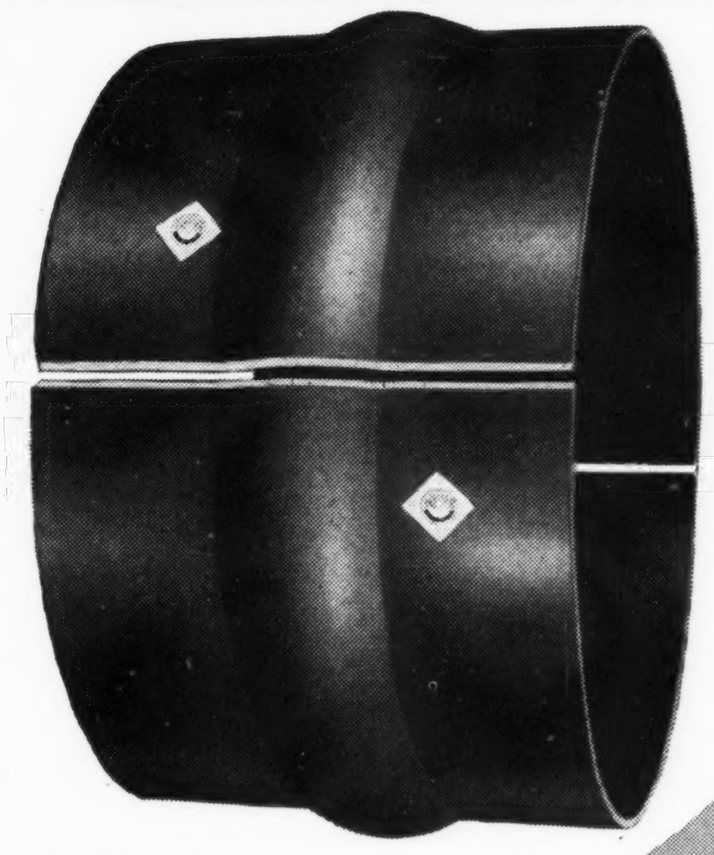
The goal of the company was first, to minimize inconvenience to the public during the laying of a major take-off from the famed Texas-to-California line, running through heavily populated residential districts and suburbs of the city of Los Angeles. It had to prevent children from interrupting work or becoming hurt around the big machines and open trenches without incurring the wrath of doting parents; to hold losses to business houses located along the right of way to a minimum and forestall claims for loss of business; to prevent inconvenience to residents in performing their daily routines; and to plan ahead for emergencies.

Public relations on the pipeline is actually not new at Southern Cal. Company inspectors have always made an effort to maintain happy relations with householders, and their record is good. Contractors' crews doing work for the utility have disported themselves creditably. But because of the magnitude of this job, a more completely organized program was essential. With so many problems to be faced, company inspectors had to be relieved of such duties in order to expedite the carrying out of their principal inspection duties.

The company found the answer in a full-time public relations man—Don Wheaton, a special representative who, during the entire time the line was being laid, advanced ahead of the crews and acted as liaison between pipeliner and householder.

And, parenthetically, in the cold

Now... WELDING SLEEVES OF DRESSER QUALITY



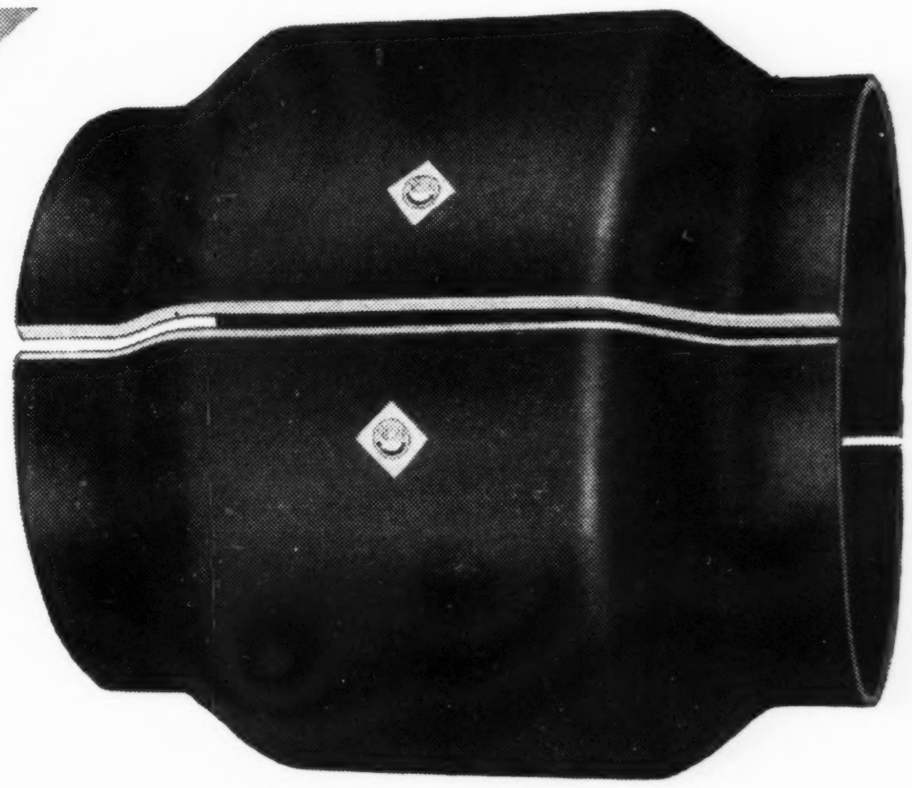
Dresser Welding Sleeve
for welded lines.

When operating conditions dictate the use of a reinforcing sleeve, choose a precision-made Dresser Welding Sleeve. Newly offered by Dresser, these sleeves are made of the best grade, flange-quality steel plate under the same rigid control standards as the long-proved Dresser Coupling.

Uniformly perfect shaping assures easy installation. Both the Welding Sleeve for welded lines and the Weld-over Sleeve for coupled lines are vented against pressure build-up.

Can be furnished in special sizes, shapes and materials when production quantities are involved.

Mail coupon for information and prices.



Dresser Weld-over Sleeve
for coupled lines.

DRESSER
MANUFACTURING DIVISION

59 Fisher Ave., Bradford, Pa. (One of the Dresser Industries). In Texas: 1121 Rothwell St., Houston. In Canada: 629 Adelaide St., W., Toronto, Ont. Sales Offices: New York, Chicago, Houston, San Francisco.

MAIL THIS COUPON TODAY!

Dresser Manufacturing Division
59 Fisher Avenue
Bradford, Pennsylvania.

Please send information and prices on:

- ☐ Welding Sleeves
  Nominal pipe sizes:.....
- ☐ Weld-over Sleeves
  Nominal pipe sizes:.....

Name_____

Firm_____

Address_____

City_____ State_____

"JUNGLE" OF BRACING was used along Santa Ana street to shore up the sides of the ditch, which was continually threatening to cave in.

business world of dollars and cents, the program was a whopping success. Although no actual money saving can be proved since the question deals in probabilities only, the company is satisfied that it saved much more than the cost of Mr. Wheaton's time.

While public relations was Mr. Wheaton's No. 1 job, Junior was his No. 1 worry—a worry compounded by the fact that the five-month job, started in March and wound up in August, was at its peak during the summer season when restless youngsters are hanging around home looking for mischief to get into. They would have liked nothing better than to have scooped their little friends up in a skip loader and deposited them in the nearest manhole—or to have played follow-the-leader through the ditch, into the pipe, and all over a side-boom tractor. In fact, they might have had a field day had not proper steps been taken in advance to forestall such activity.

Mr. Wheaton brought psychology, tact, and careful planning into play to solve the juvenile problem—and the success of the effort is attested to by the fact that no known injuries were recorded during the entire operation. Only one minor injury was reported, and that via the grapevine, so whether it actually occurred was not known.

He used neither whip nor shotgun to keep the juveniles out of trouble. He kept a weather eye out for them as he made his rounds; if he found one or a group gathered near the ditch, he would join them and engage them in conversation. Any and all questions were answered fully and freely—often a time-consuming job. He made a practice of explaining operations in semi-technical terms rather than talking down to them. The questions, he found, were for the most part very intelligent. And his bothering to take time to explain undoubtedly gave the children a feeling of "belonging," of being let in on something. They assumed a sense of responsibility which certainly contributed toward keeping them out of trouble.

The main job, of course, was to plan in advance. While following no rigid schedule, Mr. Wheaton ordinarily lined up for a day's work the contacting of tenants of every house and business in the area where the men would be working the following day. He found that talking over the situation with people just before the event gave them little time to forget. Besides, most people don't plan their days far in advance.

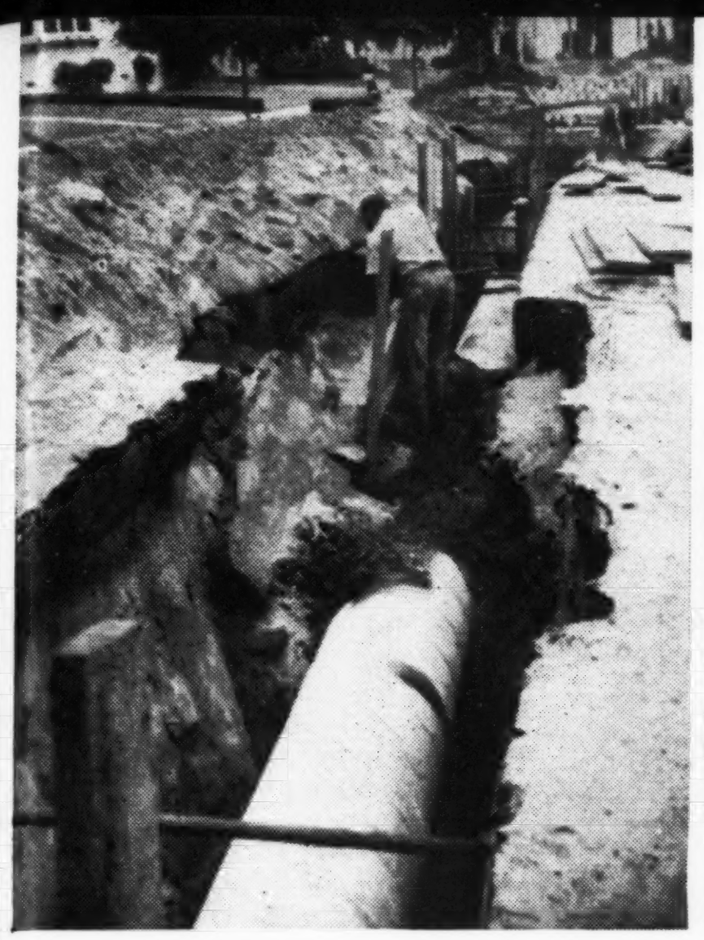
Calling on a typical home, he would introduce himself and state his business, which usually was enough to startle people, unaccustomed as they were to such deferential treatment. He would learn their routine—when the man left for work, if he drove, when the housewife did her shopping and whether she drove her car—how many children were in the family, how they were transported to school or to other organized activities, what time they left, etc. Noting such facts as might be pertinent, he would explain how the job would progress, point out the hazards, and—usually indirectly—elicit the householder's cooperation. Often he didn't have to ask the housewife to keep the children out of trouble—more often she would offer to do it. From 8 to 5, he told her, the men on the job would take every precaution to prevent injuries to children and would endeavor to watch their activities as much as possible; but after those hours it was up to her.

In at least one case, this idea of talking things over ahead of time turned a potential hazard into a winner. Noting some Cub Scouts in a certain neighborhood, he located the "den mother," and had a chat with her. The chief worry was that the cub meeting place was located right on the line, and the meeting time was after work was finished for the day. Immediately recognizing the problem, the den mother herself suggested that she cooperate. And when Mr. Wheaton "happened" to refer to the gas company's film showing the building of the Texas pipeline—"Westward Flow"—she asked if it might be shown for the young scouts. A father-and-son dinner was arranged, at which more than 100 persons saw the movie and came away with a heightened knowledge—and a consequent appreciation—of the gas business.

And the scouts steered clear of the ditch.

This performance was hardly typical, of course. It was followed, however, in one other instance in such a way as to avert a potentially serious situation. Toward the eastern end of the line, in

A SERIOUS PROBLEM in good will: equipment scattered on lawns along a particularly tough stretch of line on Santa Ana street. This portion required two months to lay because of water encountered at 4-5 ft, and considerable congestion of equipment resulted. AT RIGHT is shown an example of bridging performed across the ditch to permit residents to come and go.



AT LEFT another bad cave-in area is shown. Although the ditch was flooded each night in an effort to prevent slippage, each time it was opened new cave-ins would result. CENTER PHOTO shows crews repairing a 2-in. line break and, again, workmen did not lack spectators. THE IMPROMPTU "golden weld" ceremony shown at right also drew its share of spectators. Half the neighborhood turned out to supervise work.

a mushrooming satellite called Bell Gardens, the line ran past a grammar school yard where 600 active youngsters threatened to disrupt operations completely. But Mr. Wheaton checked with the principal well in advance of construction, and obtained a promise of absolute cooperation. Pupils were given a "briefing" by their teachers, and the sheriff's office delegated guards to stand watch during those times of the day when students would be going to and from school. But the real clincher was a showing of the movie, which again proved that if you "let people know," they gain a sense of belonging, and adopt a more responsible attitude —regardless of age.

Incidentally, this particular situation was complicated by the fact that crews struck quicksand very close to the schoolyard and on the edge of a trailer court. Intensive education of tenants was necessary to prevent mishaps.

Children, however, weren't the only curious ones. Several grownups put in extended shifts at sidewalk superintending, and one made quite a project of it. He set up a chair as near operations as he could, and followed the work for several days, always taking his chair along with him. Another, a service station operator, while being checked for possible inconvenience caused by the ditch running past his property, told Mr. Wheaton that watching the X-ray equipment—which, by the way, X-rayed every weld on the line—had been an education in itself.

Efforts to minimize loss of business to the service stations and neighborhood groceries which dotted the route of the line proved highly successful. Extra care was taken to keep the ditch adequately bridged at all service station driveways, to keep parking lots open to traffic, and to level spoil banks in locations where they might otherwise hinder the flow of vehicles.

There were numerous instances which gave SoCal the opportunity to prove itself "human." There was an asthmatic girl, for example, who lived in a house facing the ditching operation . . . While the work was progressing, a water truck passed back and forth constantly, keeping the dust under control . . . A woman wanted to go away for the weekend, and the crew was instructed to keep the roadway clear of obstructions at the appointed hour. An hour-and-a-half late in leaving, she nonetheless had a clear track past the work . . . Yet the work was hardly ever delayed on anyone's account—it was merely coordinated through advance planning.

One woman had just planted a new hedge, and was worried lest the crewmen trample it. Her fears were unfounded. They built a temporary fence around it to keep themselves off!

An expectant mother lived along the route, and complete arrangements were made so that she might egress at any time of the day or night . . . At another place, a boarding house for elderly persons, the way was kept clear for an ambulance at all times . . .

There were other examples of the company and contractors going out of their way to please . . . Having equipment for the job handy, crew members helped out a motel owner by digging a small trench for a conduit he wanted installed . . . Alongside a nursery, the owner had planted trees on the parkway. When the ditch was dug nearby, he predicted that the trees would die. Although not legally liable to the nurseryman as the parkway is city property, the company made provisions for their protection . . . A Mr. Brown complained about the company leaving equipment for several days (unavoidably) on "his" parkway (actually city property). The brown spots on the lawn which resulted were quickly made green again with some fertilizer, which Wr. Wheaton applied himself.

Mr. Brown is now one of the gas company's staunchest admirers.

But perhaps the most ardent boosters of the gas company are two government employees—the postmistress at Rivera and the postmaster at Bell Gardens. They were easily the most astonished.

Each community has extensive RFD routes, with mailboxes scattered along both sides of every street. Paying a courtesy call at both postoffices, Mr. Wheaton and a contractor's representative conveyed their regrets at having to disrupt postal work. Boxes on one side would have to be removed—only temporarily, of course.

Would the post office like them all placed on one side of the street while work was in progress so that delivery would be expedited?

And—when SoCal finished its work, it would indeed be glad to return them to their original locations . . . Needless to say, post office officials accepted the proposal.

Mr. Wheaton declares that the good resulting from his work was only possible through the complete understanding and cooperation given by the contractor—from top supervision to helper.

The company inspectors were also given a full share of credit for their help and consideration in maintaining good relations with the company's customers during the period of construction.

At left, "Reclaimer" elevator device lifts gas pipe from ground, after it has been loosened by cutter and forward shoe.

Sideboom tractors follow the reclaimer right up the hillside (below). Machine is capable of flexible operation, is very effective in rolling country.

Sideboom tractors lift pipe clear of ditch, after elevators have wedged pipe from its burial place (second from bottom, below). Next step is performed by cleaning machine.

In bottom picture, below, pipe rests near ditch, ready for cleaning, cutting work.

At far left, below, is a closeup view of the forward section of the reclaimer, showing cutters in action. Shoe, which cuts dirt, is attached to bars shown.

Center picture at bottom shows final reconditioning step — longitudinal re-welding in Oklahoma City shops, before pipe is re-buried.

OKLAHOMA 'RECLAIMER' EASES PIPE RECONDITIONING TASK

WHEN it wanted to take up 64 miles of 12-in. line for reconditioning, Oklahoma Natural Gas Co., Tulsa, recently pressed into service the "reclaimer," a grave-robbing device which can expose pipe without uncovering it first. It simply roots it out at one whack, pulling the cover with it, in a continuous "production-line" operation.

Not unlike the "Joe Dog" (*GAS*, March, 1948, pp. 42-43), which operates on small-diameter lines, the reclaimer employs a shoe which slips underneath the pipe and forces it up out of the ground, with twin cutting blades to cut the earth cover; but it also features an "elevator," which helps to push the pipe upwards out of the ground. The cutting blades rest on top of the pipe, and precede the shoe. The latter is a half section of pipe which cradles the pipe as it forces it away from the earth, and its leading edge is sharpened for cutting the dirt away underneath. It is fastened to the plow unit by two steel bars attached on either side.

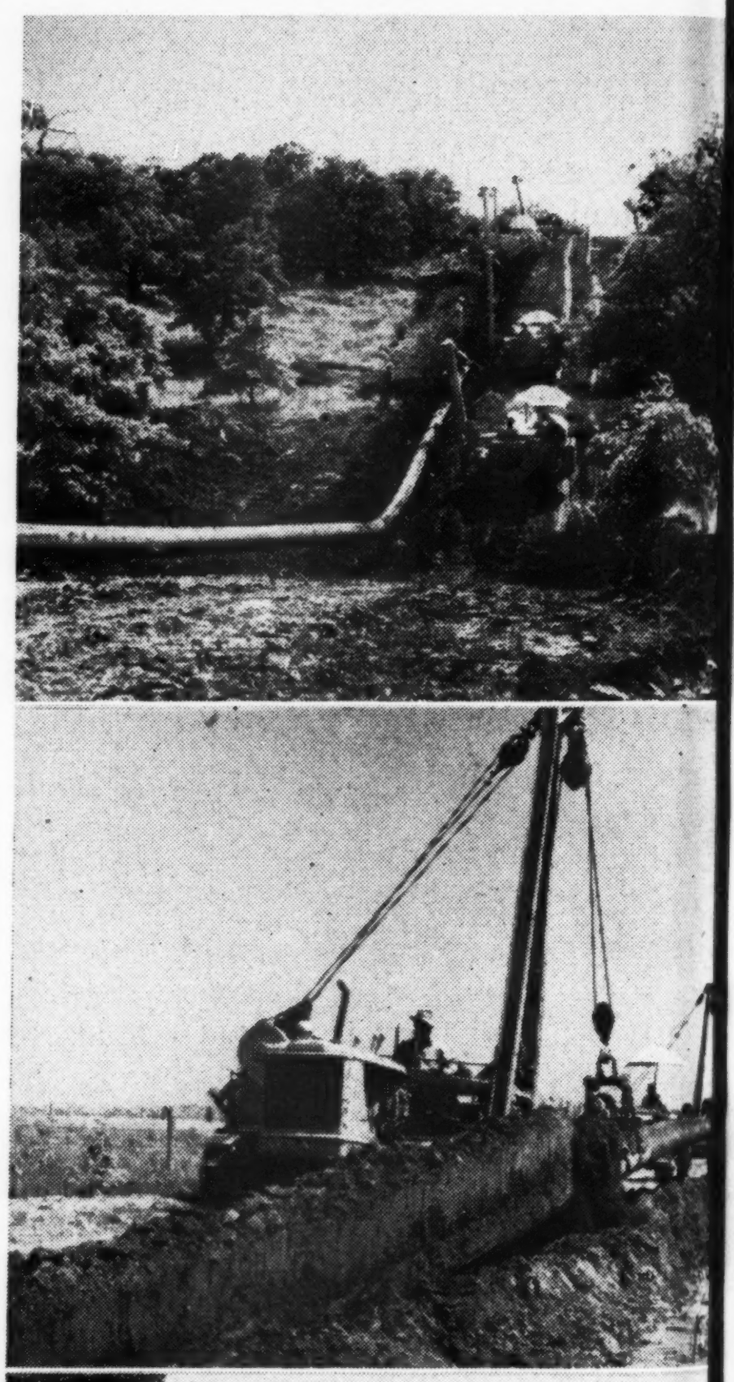
The elevator, which brings up the rear, is a wedge-shaped shoe, tapered from back to front to force the pipe up out of the ditch. Taper angle is varied in accordance with depth and size of the pipe and soil conditions.

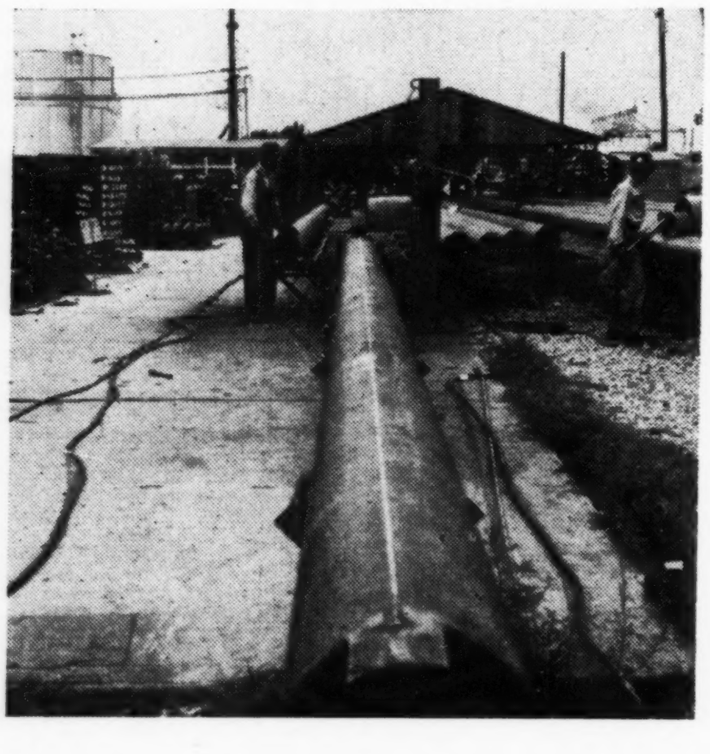
From three to five tractors are used as tows, and two side-boom tractors follow at a distance of about 30 ft to lift the pipe clear and lay it to one side.

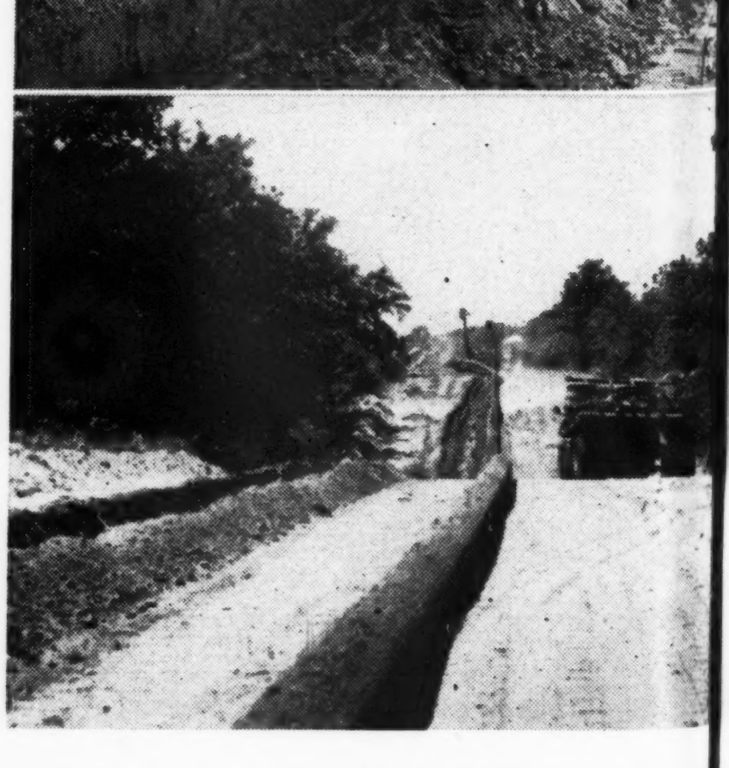
Following takeup, a pipe-cleaning machine scrubs away dirt and scale and the pipe is cut into sections for transport to the plant of Black, Sivalls & Bryson, Oklahoma City, where it is re-welded longitudinally. This must be done to assure its withstanding higher pressures than were heretofore necessary.

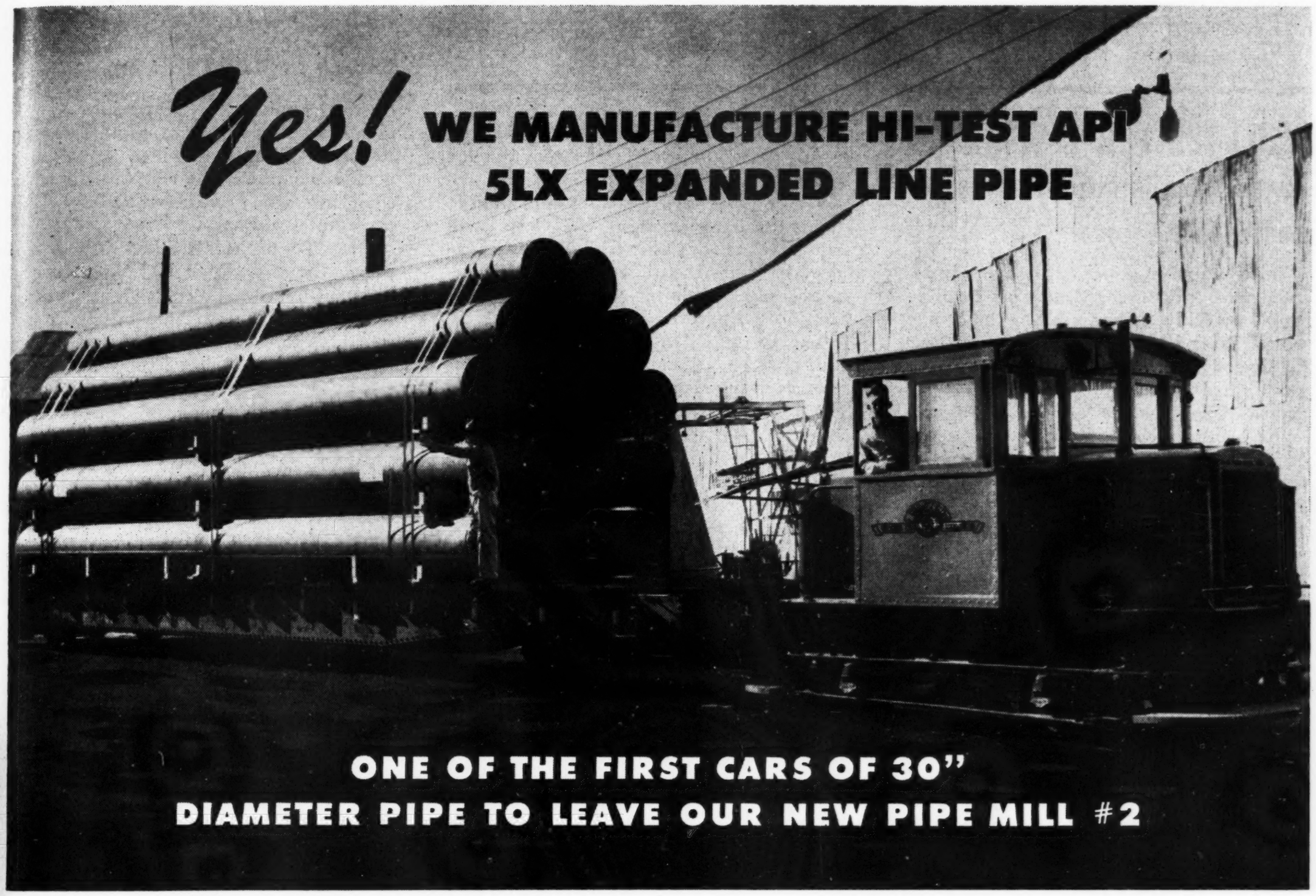
The reclaimer averages 15,000 ft per day, and has taken up as much as 10 miles of pipe in 15 hours.

Courtesy *Oklahoma Natural Gasette*. Photos by Ruth Canaday.









Plant Designed to Produce 20 Cars a Day of Expanded Line Pipe

The #2 Pipe Mill, recently completed at Master Tank & Welding, is now in operation, producing Hi-Test Expanded Line Pipe by the roll process. If your job warrants greater production, present production can be greatly increased.

Call in your specifications. We can fill your order for sizes ranging from 20" through 36" in sections 30′ to 31½′ long.

Line Pipe Division

MASTER TANK & WELDING

MASTER GAS SYSTEM — MFG. BY MASTER TANK & WELDING

P. O. Box 5146 • DALLAS, TEXAS • Phone Prospect 7-2441

PIPELINE NEWS

RESERVES FOR CHICAGO

Texas-Illinois signs for gas, alters plans

Adequate gas supplies have now been secured from rich Texas Gulf coast fields to supply the $150 million pipeline to Chicago which Texas Illinois Natural Gas Pipeline Co. intends to build. The company, which was formed last summer as a subsidiary of Peoples Gas Light & Coke Co., Chicago, would bring to the area a minimum supply of 300 MMcf per day, according to James F. Oates Jr., chairman of Peoples Gas Light.

Original plans for the project (*GAS*, Aug. 1949, page 92) have been altered in accordance with the necessity of obtaining sufficient reserves to supply the line. Rather than having its beginning in the Houston region and extending to Joliet, Ill., the line will now take off from the Rio Grande valley, a distance of approximately 400 miles. Because of the additional 400 miles of pipe required, cost estimates have been revised upward from the original $100 million figure.

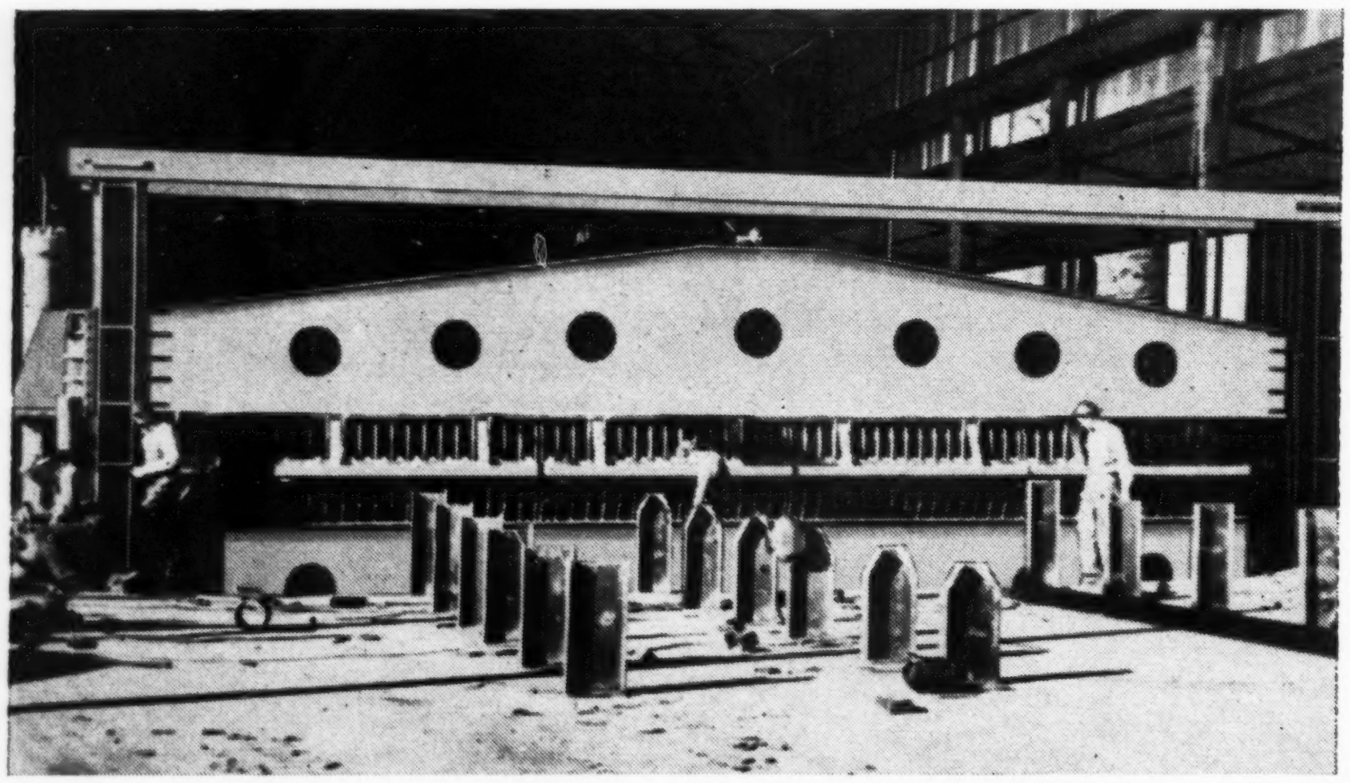
A recent agreement was reached with the Gulfcoast Northern Gas Co., Tulsa, which provides that Gulfcoast will furnish the needed reserves. Texas Illinois will take over the assets of Gulfcoast Northern, exchanging for them $1 par shares of Texas Illinois company stock. By this transaction Gulfcoast Northern stockholders will gain a 50% interest in Texas Illinois, while Peoples Gas will retain the other 50% interest. Gulfcoast Northern then will be dissolved.

Peoples Gas Light and other customers of the Natural Gas Pipeline Co. of America, another Peoples Gas Light subsidiary now serving the Chicago area, will have first call on any gas transmitted by the new pipeline up to 300 MMcf per day. Texas Illinois will take over Gulfcoast Northern's obligation to supply Piedmont Natural Gas Corp. with 285 MMcf per day after Chicago area customers have been satisfied, provided Piedmont's proposed pipeline up the Atlantic Seaboard is approved before next March 31.

The alterations to the original plan were necessitated by difficulty in obtaining reliable reserves in the Houston area in the face of a highly competitive sellers market, according to Mr. Oates. Construction work on the new line, which will have an ultimate capacity in excess of 500 MMcf, is expected to get under way this year if the FPC approves.

Commitments have been obtained for practically all of the steel pipe that will be needed for the line. If progress is "normal," the line will be in operation late in 1951.

Beneficiaries of the new line would include the Chicago District Pipeline Co., another Peoples Gas Light subsidiary distributing gas to Peoples in Chicago; Public Service Co. of Northern Illinois and Western United Gas & Electric Co., both serving northern Illinois communities outside of Chicago; Northern Indiana Public Service Co., serving northern Indiana communities; as well as North Shore Gas Co., Illinois Northern Utilities Co., Iowa-Illinois Gas & Electric Co., Central Illinois Electric & Gas Co., Kewanee Public Service Co., Illinois Power Co., Princeton Gas Service Co., and Allied Gas Co., all located in Illinois; United Gas Service Co. and Wilson Gas Co. in Kansas; Central States Electric Co., Iowa Power & Light Co., and Iowa Southern Utilities Co. in Iowa; City of Nebraska City, Nebr., and Wisconsin Southern Gas Co.



Master Tank Adds Expander

A modern expanding unit capable of handling line pipe up to 36-in. diameter in sections 31½ ft long has been installed in the No. 2 pipe mill of Master Tank & Welding Ltd., Dallas. The pipe expanding method permits higher line pressures with fewer compressor stations.

The equipment installed by Master Tank weighs in excess of 100 tons. When the top beam is raised, the expansion cable is lifted, permitting pipe to roll into position. Hydraulic cylinders in both ends move in to form a pressure seal, permitting the pipe to be filled with water. With the upper and lower rams locked together, water flows into the pipe up to a pressure of 2500 lb.

Michigan-Wisconsin Would Double Capacity of Line

Michigan-Wisconsin Pipe Line Co. last month asked the FPC to approve the construction of facilities which would nearly double the present annual capacity of the company's newly completed Texas-to-Michigan natural gas line.

The $25 million facilities include compressor horsepower of 115,560 which the company holds would enable it to increase its annual capacity from 56.6 billion cu ft to 110.6 billion cu ft. Present authorized compressor capacity is only 21,600 hp.

The application was submitted jointly by Michigan-Wisconsin and Michigan Consolidated Gas Co.

In the joint application Michigan Consolidated seeks to install $4.5 million facilities necessary to utilize its Reed City, Mich., storage field to provide additional capacity. The company would build a 21-mile, 24-in. line from Austin field to Reed City field; install an additional 9600 hp at Austin field compressor station; build a dehydration plant and metering station at Reed City; and drill additional wells and enlarge the gathering system at Reed City. These facilities would be leased to Michigan-Wisconsin.

Second Line to St. Louis Put Into Operation

On Nov. 29 Mississippi River Fuel Corp.'s $36 million natural gas line from Monroe, La., to St. Louis was put into service. This is the second Mississippi River Fuel line to serve that city. This second line, which consists of loops along the original line, has been in partial operation for some time.

With the welding of the final sections near Frederickstown, Mo., its total capacity reached 133 MMcf, duplicating the capacity of the original line. By virtue of the completion, combined capacity is increased from 185 MMcf to 266 MMcf per day.

The company also has a pending application to increase the capacity of the second line by 62 MMcf through the addition of compressor horsepower which would cost $3 million. The second line, of 24-in. diameter, is 435 miles long.

New York Counties To Get Natural Gas in 1951

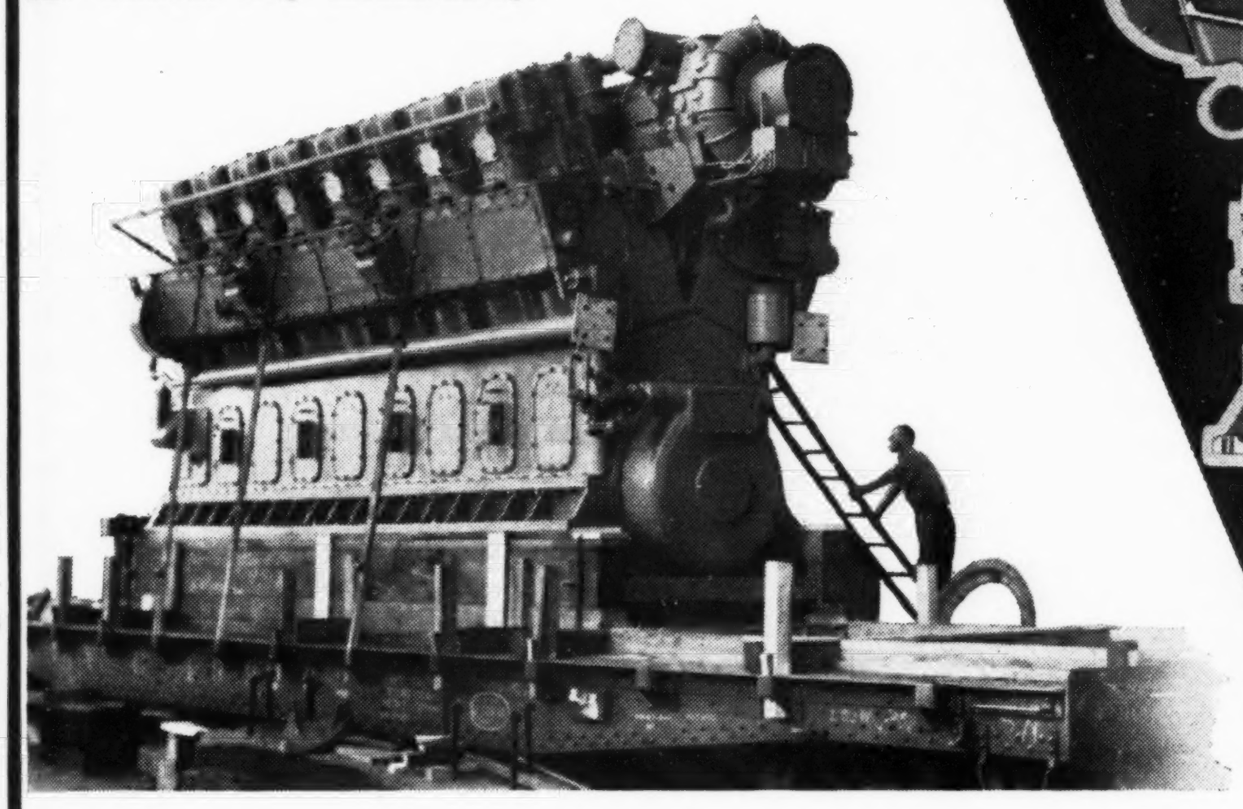
A 40-mile pipeline takeoff from an $18,000 metering and regulating station at Tuxedo, N.Y., will by next year be carrying natural gas for distribution in Dutchess, Orange and Ulster counties, New York.

FPC authorization was given to Central Hudson Gas & Electric Corp., Poughkeepsie, last month to build the line and to Home Gas Co. to build the regulating station. The line itself, together with appurtenant facilities, will cost $1.7 million.

Deliveries are expected to be made by Aug. 1, 1950, benefitting four sizeable cities —Poughkeepsie, Newburgh, Kingston, and Beacon—as well as several small villages and unincorporated towns. West Point and several industrial plants will also benefit.

RIGHT: cross-section of Cooper-Bessemer LSV diesel (15½" bore, 22" stroke) showing rugged, compact design and articulated connecting rods. Features include, large 13½" diameter counterbalanced crankshaft, unusually low bearing pressures, and exceptionally low head room.

BELOW: Cooper-Bessemer 16-cylinder LSV engine, rated 3,400 hp at 327 rpm, mounted on flat car ready for shipment. As shown, complete factory-tested engine can be shipped as a unit without any disassembly.



Another Example of Efficient Power at Lower Cost

COOPER EST. 1833 BESSEMER

Announcing "V-DESIGN"

OF THE FAMOUS COOPER-BESSEMER TYPE LS ENGINES

featuring . .

- **Unequaled space, installation and operating economies**
- **Compact 12 and 16 cylinder sizes**
- **Up to 3,400 horsepower**
- **Full diesel, gas, gas-diesel operation, supercharged or atmospheric**

IT is well known that users of Cooper-Bessemer *in-line* LS engines have profited by engine performance seldom equalled in the 800 to 1700 hp class.

Now, the LS "V" design offers *double* the power in *practically the same space*, while retaining the exceptional stamina, high efficiency and low maintenance characteristic of LS operation. *Today, no comparable engine offers as favorable a power-to-space ratio.*

The advantages are obvious. Total power requirements can be met with fewer or smaller engines, permitting big direct savings in the cost of buildings, foundations, installation, over-all operation and maintenance.

Like the in-line LS, the LSV is built as a full diesel, gas-diesel or spark-ignited gas engine. If your interest lies in full or partial gas operation, bear in mind that Cooper-Bessemer gas-diesels offer exceptional efficiency over the *entire* load range. . . and that Cooper-Bessemer spark-ignited gas engines can now be supercharged, permitting sensational new economies compared with ordinary gas engines.

The
Cooper-Bessemer
Corporation

MOUNT VERNON, OHIO — GROVE CITY, PENNA.

New York City Washington, D. C. Bradford, Pa. Parkersburg, W. Va.
San Francisco, Calif. Houston, Dallas, Greggton, Pampa and Odessa, Texas
Seattle, Wash. Tulsa, Okla. Shreveport, La. St. Louis, Mo. Los Angeles, Calif.
Caracas, Venezuela Gloucester, Mass. Calmes Engineering Co., New Orleans, La.

Brilliant Pipelining Job, "Toughest Inch," Completed

The H. C. Price Co., Bartlesville, Okia., can lay claim to one of the most brilliant pipeline construction achievements of 1949—the laying of 200 miles of the "Toughest Inch," a 26-in. line cutting directly across the rugged Allegheny and Blue Ridge mountains of West Virginia to Rockville, Md. In operation, the line will supply critically needed gas to Baltimore and Washington.

Atlantic Seaboard and Virginia Gas Transmission Co., subsidiaries of the Columbia Gas System, will operate the pipeline, which went into service Dec. 11.

Consider these facts in judging the propriety of the pipeline's appellation, "The Toughest Inch:"

Total cost, $15 per ft, over $79,000 per mile.

Equipment, some of it the world's largest, used by each of the four spreads, $750,000.

Road and highway crossings, 216.

Railroad crossings, 9.

Mountain stream and creek crossings—hundreds.

Rock and earth moved, 5 million cu yds.

Dynamite used in ditching, 1½ million lb.

Excavation through solid granite, 156 miles.

Statistics, of course, do not reveal all the hazards of the job. The near-vertical slopes of the two mountain chains made operations slow and dangerous. Nonetheless, Price completed its share of the work in 186 days, commencing laying on May 5, 1949, and winding up Nov. 9.

United Gas Loop Approved; Mississippi River To Benefit

An FPC presiding examiner's decision late in November authorized United Gas Pipe Line Co., Shreveport, to build 105.6 miles of 20-in. loop in Louisiana which would increase the company's capacity for delivering natural gas to Mississippi River Fuel Corp., St. Louis, by 122 MMcf per day.

The line, which would parallel United's existing 24-in. Carthage, Texas, to Sterlington, La., line, would cost $5.1 million and would bring the total delivery capacity to Mississippi River Fuel to 195 MMcf per day. Total daily delivery capacity of the Carthage-Sterlington line would thereby be upped to 432 MMcf.

Mississippi River Fuel recently elected to exercise its right to receive additional gas as provided for in its gas purchase agreement with United to compensate for increased deliveries from other sources of supply.

Storage Lines Proposed

Twelve miles of pipeline, including three miles of 10-in. and nine miles of 20-in. line, which would transport natural gas received from Tennessee Gas Transmission Co. to two underground storage pools in West Virginia, will be built by United Fuel Gas Co., Charleston, W. Va., if the FPC approves an application submitted by the company last month.

Included in the total cost of $1,326,000 for proposed facilities listed in the application are certain changes in existing facilities, chiefly in the transfer and modification of compressor units.

The facilities, according to United Fuel Gas, are necessary to insure adequate and continuous service to present markets.

First Section of Super Inch Operates As Intrastate Loop

Pacific Gas & Electric Co., San Francisco, which together with El Paso (Texas) Natural Gas Co. is building the "Super Inch" line to link Texas and New Mexico fields to northern California customers, has announced completion of the first 80-mile section of the 34-in. carrier. The section extends from Llanada to Milpitas, terminal of the line.

The initial section has been placed in operation by a connection with the existing line from Kettleman Hills in the San Joaquin valley of California to the Milpitas measuring station, where gas from San Joaquin valley fields is delivered to the company's system. This temporary looping will make available to the system an additional 60 MMcf.

Meanwhile, construction has been shifted to the southern end of the route near Topock, Ariz., just across the border from California. In the desert country northwest from Topock, work will proceed throughout the winter. The project, which is scheduled for completion by Jan. 1, 1951, was started last June 29 by Bechtel-Conyes-Price, contractors.

Montana Line to Link Butte and Bozeman

An 83-mile natural gas line connecting Butte and Bozeman, Mont., and bringing service to four southwestern Montana cities for the first time, will be built next spring, the Montana Power Co. has announced.

First major gas transmission construction to be undertaken by the company since 1931, the line will result in connection of the company's east and west systems and will improve continuity of service to presently supplied areas, as well as providing the four cities with gas for the first time.

Construction of the 12¾-in. welded line, which will cross the main range of the Rocky mountains just east of Butte, is expected to be completed during next summer to make service available to new areas by next winter.

Although this is the first major transmission construction in 18 years, Montana Power has been busy for the past two years on other construction work, including the building of 18 compressor stations totaling 4150 hp which were installed in the Cut Bank field.

New Hampshire Wants Natural

Three New Hampshire gas distributing companies have joined the ranks of New England utilities seeking Texas gas.

Nashua, Manchester, and Concord have all signed contracts with Northeastern Gas Transmission Co., whose application for a line to New England is pending before the FPC. As previously reported, Northeastern Gas would obtain its supply from Tennessee Gas Transmission Co. and Transcontinental Gas Pipe Line Corp.

Okayed Wyoming Line to Serve Montana-Dakota Customers

A 340-mile line which will bring gas from the Worland gas field in Wyoming to customers in Montana and North and South Dakota was approved last month by the Federal Power Commission. The line, to be built by Montana-Wyoming Gas Pipe Line Co., and to be leased and operated by Montana-Dakota Utilities Co., will feed into the Cabin Creek compressor station of Montana-Dakota north of Baker, Mont.

By the end of 1951 the facilities will be carrying an additional 25 MMcf to Montana-Dakota's customers.

Two branch lines extending from the Wyoming-to-Montana line will also be built by Montana-Dakota under FPC authorization. These will be located at Miles City and Forsyth, Mont. The main line, which will cost in excess of $9 million, will consist of 12¾-in. pipe together with a combination gas compressor, dehydration and sulphur removal plant near the line's source.

Although the application was filed jointly by Montana-Dakota and Montana-Wyoming, the commission found that Montana-Wyoming will not become subject to FPC jurisdiction as a result of the construction.

Coincidentally, on the previous day the commission adopted the presiding examiner's decision directing Montana-Dakota to perform common carrier natural gas service for Mondakota Gas Co. (*Gas*, Dec., page 92.)

Pipeline Newsnotes

1949 was a big year in the field of oil and gas production and exploration in British Columbia. Sixteen companies joined the two who were already at work in this field at the end of 1948, and 2,750,000 acres are now under permit for exploration work. Although the bulk of exploration places the emphasis on oil, important discoveries of natural gas which have been made in the Peace River area point to promising possibilities . . . Speculation on new fuel-producing areas last month centered on the Midwest with the discovery of natural gas near Sidney, located in the cattle country of western Nebraska. Other possibilities in the area lie in the fields of oil and synthetic fuels . . . Tennessee Gas Transmission Co. is now under way with surveys through northwestern Pennsylvania for its 400-mile line to Buffalo in anticipation of construction beginning next summer . . . Hollywood's famed movie colony at Malibu Beach, Calif., will soon be cooking with natural gas as a result of a program begun by Southern Counties Gas Co., Los Angeles, last Nov. 30. The project consists of a five-mile, $150,000 extension connecting customers served by the Malibu and Las Flores butane plants to the Santa Monica Bay system. Signal Pipeline Co. was given the contract which will be completed by April 1 . . . Cities Service Gas Co., Oklahoma City, last month awarded a contract to the R. H. Fulton Construction Co., Lubbock, Texas, for the construction of 12,000 ft of 20-in. line at the company's Hugoton compressor station in Grant county, Kan. The line, which would connect the station with a 16-in. pipeline owned by Columbian Fuels Corp.,will deliver gas purchased from Columbian to the Cities Service system . . .

New WALWORTH High Pressure LUBRICANT GUN

12½" High Pressure Hose and Giant Button Head Coupling

No. 1699 Walworth High Pressure Lubricant Gun

Save Time—Save Money. With this simple, rugged portable device, it is possible to save in excess of 50% of the time generally required to lubricate Lubricated Plug Valves. It will economically and efficiently handle the stiffest grades of Walworth lubricants.

The gun is self-priming, may be used in any position, and because of its safety features cannot injure the valve.

High pressure button type grease gun fittings—instead of the lubricant screw which is usually furnished—are available for installation on the valve. By painting the valve a distinguishing color to show the service under which the valve operates, and painting the barrel of the gun with the same color, untrained personnel can lubricate valves with the assurance that the correct lubricant has been used.

Walworth has improved and simplified its lubricants so that with a minimum of nine lubricants it is now possible to handle satisfactorily practically all industrial services. The new Walworth 517 and 514 lubricants will take care of 95% of the service conditions encountered in the handling of Petroleum Products and Gas Pipe Lines. The other seven lubricants will take care of most other petroleum, chemical, and industrial services.

All Walworth lubricants are available in Jumbo stick size, individually wrapped and packed 10 sticks per box. Two Jumbo size sticks will completely fill the barrel of the Walworth Lubricant Gun.

for lubricating lubricated plug valves

WALWORTH

valves and fittings

60 EAST 42nd STREET, NEW YORK 17, N. Y.

For best results use Walworth Lubricants in Walworth Lubricated Plug Valves.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

ANNUAL PIPELINE PROGRESS REPORT

The progress reports listed below cover the entire year 1949. They represent the progress made on projects conducted by 22 companies totaling 7167 miles. The total miles of pipeline actually laid during 1949 aggregate 4302 miles.

CONSOLIDATED GAS UTILITIES CORP., Oklahoma City, completed a 15-mile, 12¾-in. line from Elk City field to Carpenter compressor station. This work was started in September and completed in October. Cities in the company's general system benefited. The company also constructed a new compressor station in Chickasha field, Okla., between October and December. Total horsepower: 1200. L. L. Dresser contracted the latter job.

LONE STAR GAS CO., Dallas, started and completed three major lines in 1949. Line D, 69 miles of 20-in. line from Opelika, Texas, to White Rock measuring station east of Dallas and 24.6 miles of 20-in. line from White Rock station to line C west of Irving, was started in September 1948 and completed Nov. 15, 1949. Capacity: 179 MMcf per day. Customers in the Dallas and Fort Worth areas benefited from the construction. Eastern Construction Co. contracted the 69-mile stretch.

Line N, totaling 215 miles including 10-, 8-, 6-, 4-, and 3-in. pipe, from Pottsville field, Texas, to Kerrville and Marble Falls, Texas, with a capacity of 17 MMcf per day, was started June 1 and completed Dec. 7.

Line Second L-8-A, 25 miles of 20-in. from Riesel to Groesbeck, Texas, with a capacity of 35 MMcf, was started May 5 and completed Aug. 1. Waco and Temple, Texas, will benefit.

UNITED GAS PIPE LINE CO., Shreveport, worked on 13 major projects in 1949. The north Mississippi project, consisting of 82 miles of small diameter pipe extending from connections on the Tennessee Gas Transmission Co. main line, was constructed by L. E. Farley Inc. between March and November. Towns in northern Mississippi will benefit. A 4-in. line to Giddings, Texas, consisting of 12½ miles of pipe was built by Massey Pipe Line Construction Co. in August.

From Burnell field in Bee county, Texas, 72 miles of 20-in. line was built between August and November by Brown & Root Inc. to a connection with facilities near San Antonio. A 12¾-in. line was built by Brown & Root around the east side of the city of Austin. Length: 12 miles. This was completed in October.

A Baxterville (Miss.) field gathering system was built by O. C. Whitaker Co., Fort Worth, in June and included 10 miles of various-size pipe. From Baxterville field a 20-in. line running 90 miles to existing facilities near Mobile, Ala., was completed in November. Approximately 6 miles of 10¾-in. line was built by Massey from the Magnet-Withers field, Wharton county, Texas, to United's 18-in. Refugio-Houston main line. This was completed in April. Approximately 5 miles of 6⅝-in. line was built by Massey from Prasifka field, Wharton county, to existing facilities in May.

An 8⅝-in. line was laid by James R. Stewart Contracting Co., Houston, running 8 miles from Thompsons field in Fort Bend county, Texas, to the company's 18-in. Refugio-Houston main line in August. A gathering system in Coy City field, Karnes county, Texas, built by Massey, and running about 10 miles, was finished in May. A gathering system in North Port Neches field, Orange county, Texas, by Stewart, consisting of about 8 miles of line, was completed in November.

A 20-in. loop along the 24-in. Carthage-Sterlington line was under way. Whitaker completed the first section consisting of 39 miles in Louisiana and had begun clearing right of way for a second section, consisting of 40 miles—also in Louisiana. This latter section will be completed early this month. Brown & Root was to complete this month another 27 miles of line, also in Louisiana.

A 16-in. 19-mile line around San Antonio is to be completed by Brown & Root this month.

TENNESSEE GAS TRANSMISSION CO., Houston, has installed a total of 479 miles of large diameter pipe along its main line in 1949, in addition to 21,800 compressor horsepower. H. C. Price, Anderson Brothers, and Morrison Construction Co. were contractors for the various sections.

R. W. Day (center) receives record-breaking $300 check from Irving K. Peck, vice president, Manufacturers Light & Heat Co., Pittsburgh, for his prize-winning suggestion—a special tool to remove the burr from the inside and outside of gas well tubing. Production Superintendent C. J. McMahan looks on.

COLORADO INTERSTATE GAS CO., Colorado Springs, completed several loops and laterals. From June through November a 4-in. lateral to Florence, Colo., an 8-in. lateral to Pueblo, and a 16-in. lateral to Denver, totaling 10.7 miles, were laid. In the period February through December, the company also installed a 38-mile, 20-in. Denver loop; a 16-mile, 20-in. gathering system loop; a 6-mile, 4-in. Hugo lateral, and 52 miles of gathering lines in Hugoton field. For the first project, costs ran $196,000. For the latter project, the total was $2,348,500. Compressor horsepower totaling 12,000 was also installed. Fulton Construction Co. and Cheek Construction Co. had the contracts.

NORTHWESTERN UTILITIES LTD., Edmonton, Alta., installed two lines in 1949. A 17-mile, 16-in. carrier from Uncas, Alta., to Edmonton, costing $720,000, was built between June and September. This will complete a third transmission line to Edmonton from Viking, Alta., a total of 80 miles.

SOUTHERN UNION GAS CO., Dallas, constructed four major lines. A 35½-mile, 14-in. loop was laid along the Albuquerque, N. M., main line at a cost of $1,086,000. A 10-mile, 10-in. loop on the Roswell, N. M., main line and an 11¾-mile stretch of 10-in. loop on the Carlsbad main line, together costing $375,000, were also completed.

A 10½-mile, 4-in. line was built from Tippett field, Texas, to McCamey, Texas, at a cost of $50,000. An 8.2-mile, 10-in. line looping the Clovis, N. M., line was installed at a cost of $155,000.

TRANSCONTINENTAL GAS PIPE LINE CORP., Houston, laid 485 miles of 30-in. main line on its 1840-mile line from Texas to New York during 1949. Contracts covering 1950 construction from nothern Georgia to New York City have been let to Williams Brothers; R. H. Fulton Co.; Smith Contracting Co.; Associated Pipe Line Contractors Inc.; Wunderlich &

COMPARE
These Features!
• EXACT location of buried pipes, mains, services, gates, tees, ells, stubs, etc.
• Weighs only 11 lbs. complete—one man operation!
• New electronic circuit provides strong, positive location signal.
• Uses standard miniature radio tubes and flashlight batteries.
• Lasts a lifetime—guaranteed superior performance.
Goldak Invites Comparison
Does the work of a Heavyweight
GOLDAK
Featherweight
PIPE LOCATORS
The GOLDAK Co
Leading Makers of PIPE LOCATORS Since 1933
1542 WEST GLENOAKS BLVD.
GLENDALE 1, CALIFORNIA

Griffis; Oklahoma Contracting Corp.; Raymond Concrete Pile Co.; and Omaha Dredge & Dock Co.

Pipe deliveries after the recent steel strike are rolling again with 6351 cars having been shipped. Surveying of the entire line is about complete. Right-of-way acquired totals 1108 miles for the main line and 62 miles for lateral lines. Five compressor stations that were being built in 1949 are well along.

Transcontinental is applying to FPC for a capacity hike from 340 to 505 MMcf.

COAST COUNTIES GAS & ELECTRIC CO., Santa Cruz, Calif., started and completed two projects during 1949. A 9½-mile stretch of 8- and 10-in. line to carry 12 MMcf per day, costing $200,000, was built from Clyde to Walnut Creek, Calif., between Sept. 1 and Dec. 15. Marten Brothers and MGM Construction Co. participated. An 8½-mile line carrying 7 MMcf, running from Watsonville to Rob Roy Junction, costing $225,000, was laid between Nov. 17 and Dec. 15 with MGM doing the job.

DELAWARE POWER & LIGHT CO., Wilmington, started construction Aug. 1 on 10 miles of 12-in. pipe from the Delaware-Pennsylvania state line to the company's gas plant in Wilmington. A total of 7.8 miles was laid in 1949 with completion scheduled for May 1, 1950. Total cost: $490,000. George & Lynch contracted the job which will benefit Wilmington and neighboring towns.

EL PASO NATURAL GAS CO. was working on four major projects. A 685-mile, 30-in. line from Jal, N. M., to the California loop line which was started late in 1948 will be completed late in 1950. In 1949, 197 miles were laid and 29,800 compressor horsepower installed. A 91-mile section of 24- and 20-in. line from Keystone to Upton county, Texas, was begun in February and completed in October. Compressor horsepower totaling 11,520 was also added.

A total of 100 miles of field and gathering lines in eastern New Mexico and western Texas, plus 11,600 compressor horsepower, was completed during the year. An 81-mile stretch of small diameter lines from El Paso to Alamogordo, N. M., was started and completed in 1949.

A thunderous explosion resounded on the Potomac river near Washington when 15 tons of dynamite were detonated, blasting a trench across the solid granite bottom of one channel of the river for a multiple crossing of four 16-in. lines. Completion of the river crossing marked the finish of H. C. Price Co.'s 200-mile portion of the "Toughest Inch" constructed for Columbia Gas System's subsidiaries, Atlantic Seaboard Corp. and Virginia Gas Transmission Corp. Workmen drilled 1048 holes 8 ft deep, 48 in apart to excavate the 1500-ft long trench.

EQUITABLE GAS CO., Pittsburgh, started and completed two lines during the year. From a connection with Texas Eastern's main line, 5 miles of 12-in. line was laid in Greene county, Pa., terminating at Rogersville. Work began in April and ended in June. Also in Greene county, 3 miles of 6-in. gas storage line was laid during September and October.

HOPE NATURAL GAS CO., Clarksburg, W. Va., started and completed three projects. Two 30-in. lines, each running 2 miles from the company's Hastings plant to the Carbide & Carbon plant at Hastings, were started in May and completed in August. Pipe Line Construction & Drilling Co. had the contract.

From L. L. Tonkin station at East Union, W. Va., Pipe Line Construction & Drilling laid 12.1 miles of 14-in. line during March, April and May. This completes the loop of the high pressure system from Cornwell station to Hastings station. A 33.4-mile, 16-in. line from Hastings to Clarksburg was laid by Pipe Line Construction & Drilling between May and September.

MOUNTAIN FUEL SUPPLY CO., Salt Lake City, between July and October laid 33 miles of 20-in. line from Coalville, Utah, to Salt Lake. Total cost: $750,000. Contractor: Enoch Smith Sons Co.

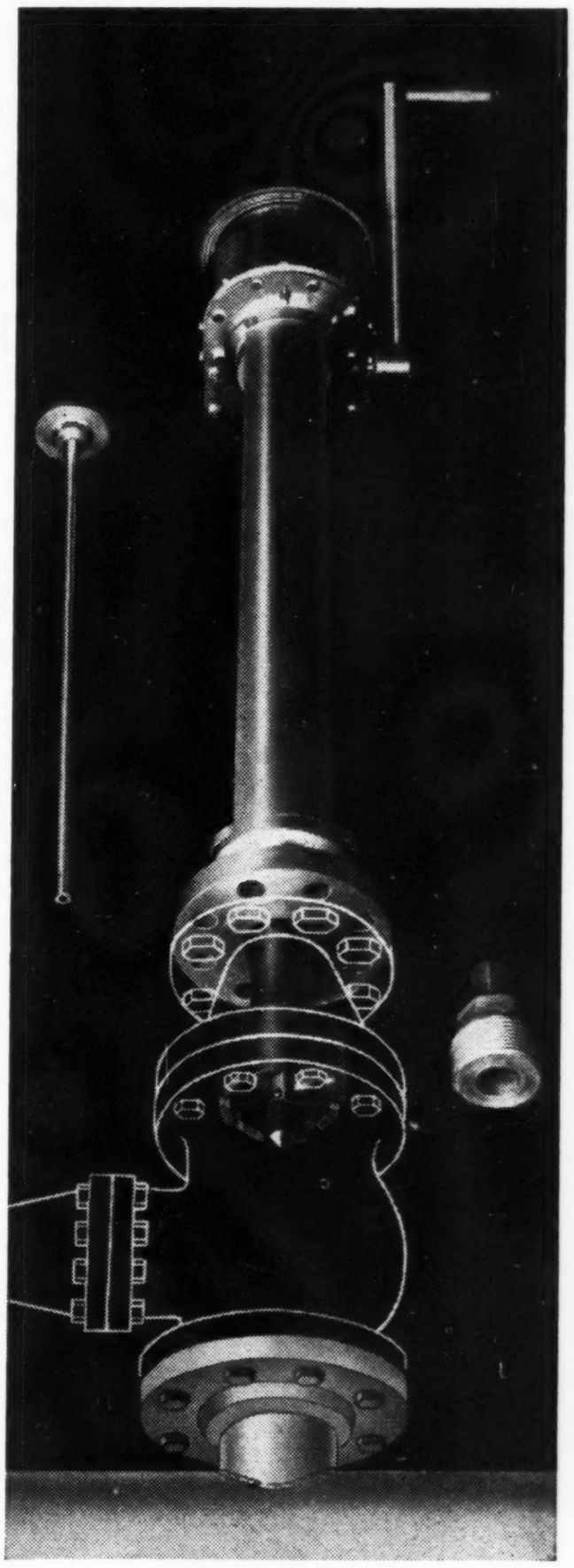
PANHANDLE EASTERN PIPE LINE CO., Kansas City, Mo., completed a main line looping started in 1948. A total of 372 miles of 26-in. line was laid, of which 210 was installed during 1949. Compressor horsepower totaled 6200. Contractors included Fluor Corp. Ltd., Dresser Engineering & Construction Co., J. F. Pritchard & Co., Refinery Engineering Co., Midwestern Constructors Inc., Fulton Engineering Co., R. H. Fulton & Co., Anderson Brothers Corp., and C. S. Foreman & Co.

PHILADELPHIA ELECTRIC CO. started and completed two projects during the year. The first consisted of 18 miles of 12- and 8-in. pipe laid from Rydal, Pa., to Penndel and Eddington, Buck county, Pa., between April and November. Tri-County Constructors, Counties Contracting & Construction Co., Bucks County Construction Co., and Henkels & McCoy collaborated.

The second line was a 4-mile, 12-in. main from Chester, Pa., to the Delaware-Pennsylvania state line started in August and completed in November. Chester Materials Co. was contractor.

SOUTHERN CALIFORNIA GAS CO. and SOUTHERN COUNTIES GAS CO., Los An-

None Other Than . . .
HILLCO
TAPPING MACHINES
Are Guaranteed
For Operation . . .



— MODEL 200 —

. . . Against 1000 p.s.i.
Line Pressure

Same machine can be operated by either motor or manual power. One machine for tapping and for plugging of tapping nipple. Light weight—100 lb.—and compact.

Nominal cutter sizes 1½" to 4". Ball and roller bearings in all main journals.

MODEL 600 for TAPS UP TO 12"

*Patent No. 2,097,398
Other Patents Pending.

THE PIG WITH THE POKE
CLEANS PIPE LINES
T. D. Williamson, Inc.
TULSA 9, OKLAHOMA

geles, completed three projects in 1949. A 15-mile, 30-in. line was laid from Rivera to Inglewood, Calif., at a cost of $1,990,000 between April and November by Alex Robertson Co. A 6½-mile length of 30-in. line was laid between August and November from El Monte to Puente, Calif., at a cost of $850,000, by Alex Robertson. A 17-mile line was laid from Encino to Thousand Oaks, Calif., between September and December. Cost: $964,000. Contractor: Signal Pipeline Construction Co.

THE CHARLESTON GROUP, COLUMBIA GAS SYSTEM, including Atlantic Seaboard Corp., Central Kentucky Natural Gas Co., United Fuel Gas Co., and Virginia Gas Transmission Corp., reported five major projects for the year. A 26-in. line from Clendenin, W. Va., to Rockville, Md., consisting of 262 miles of line was laid between April and December. Total capacity: 197 MMcf. Total cost: $23.5 million. Washington and Baltimore will receive gas through this line. Contractors were H. C. Price, Price Constructors, and Ray L. Smith & Sons.

A 23-mile, 12¾-in. line was laid from Menifee, Ky., to Winchester, Ky., at a cost of $625,000, between June and November. Capacity: 12 MMcf. Winchester, Lexington, and Frankfort will benefit. Williams-Austin Co. contracted.

A 24-in. line from Broad Run station, Clendenin, W. Va., costing $104,000, was started in June and completed in November. Contractors were Williams-Austin and H. B. Agsten Jr.

A 5-mile, 10-in. line from Tennessee Gas Transmission Co.'s main line, running to Charleston, W. Va., and costing $170,000, was laid between July and October by Williams-Austin.

A 12-mile, 10¾-in. line from TGT's main line to storage pool X-1, Putnam county, W. Va., costing $353,100, was laid by Hugh Haddox between March and May.

TEXAS GAS TRANSMISSION CORP., Memphis, started laying its main 833-mile line from Texas to Ohio in May. This includes 110 miles of 20-in. from Carthage field, Texas, to Lisbon, La.; 723 miles of 26-in. line from Lisbon to Middletown, Ohio, and 10 compressor stations with 68,800 hp. A total of 660 miles was laid in 1949 by N. A. Saigh, Latex Construction Co., O. C. Whitaker, J. R. Horrigan, Williams Brothers, Midwestern Constructors, and Omaha Dredge & Dock Co. Design capacity: 400 MMcf. Total cost: $73.5 million.

MICHIGAN GAS STORAGE CO., Detroit, began construction in January 1949 of 65 miles of 20-in. line and 10 miles of 12¾-in. line from Freedom compressor station to a point near Ovid, Mich., with a lateral to Lansing. The line was completed in June with Mahoney Construction Co. contracting. Compressor horsepower aggregating 2400 was installed.

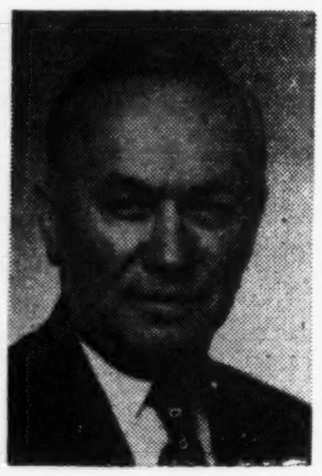
MICHIGAN-WISCONSIN PIPE LINE CO., Detroit, laid 701 miles of an 1154-mile pipeline running from Hansford county, Texas, to Austin field, Mich., in 1949. Included were 796 miles of 24-in. and 358 miles of 22-in. Compressor horsepower installed totaled 21,600. The project was started in December 1947 and completed in October 1949. Contractors included Horrigan, Oklahoma Contracting, G. G. Griffis, C. S. Foreman, Omaha Dredge & Dock, Rumsey Brothers, and Anderson Brothers.

The company also laid lateral lines to Maryville, Keokuk, Burlington, and Fort Madison, Iowa; Mount Pleasant, Mich.; Racine, Madison, Beloit, and Stoughton, Wis.

MICHIGAN CONSOLIDATED GAS CO., Detroit, completed three projects in 1949. From Austin field to Goodwell field a 20-in. storage line running 13 miles was started in August and completed in September. A 22-in. gathering line in Goodwell field running 2 miles was also started in August and completed in September.

A lateral running 23 miles from a point on the Austin-Detroit 24-in. line to Ann Arbor was begun in September and completed in November. Contractors were Somerville and E. J. Mahoney.

Pipeline People



L. F. Vonier
. . . A. O. Smith

E. P. Russell

H. L. Stowers
. . . Texas Gas Transmission Corp.

A. L. Roberts

J. T. PRITCHARD, director of A. O. Smith Corp.'s Milwaukee welding electrode and equipment division, has taken over sales activities for welding electrodes and equipment from the company's north central district, Chicago. The move was planned to bring sales and technical service to customers closer to the research and production facilities. Mr. Pritchard announced the appointment of L. F. VONIER as general sales manager for the division.

EVERETT P. RUSSELL has been named director of sales and customer relations for Texas Gas Transmission Corp., Memphis. As founder of the Russell Organization Inc. and the Russell Engineering Corp. his work has been devoted to plant site surveys, appraisals and management activities. The company also has announced the appointment of A. L. ROBERTS and H. L. STOWERS to fill important posts. Mr. Roberts was named general superintendent of the firm's pipeline system. He was previously connected with the Empire Co., Bartlesville, Okla., and with Kentucky Natural Gas Corp., a Texas Gas predecessor. Mr. Stowers, appointed chief engineer, joined Memphis Natural Gas Co., another Texas Gas predecessor, in 1937. Last June he took over as chief engineer for the Texas-to-Ohio pipeline. Texas Gas also has named DUNCAN K. FOULDS and MONTY G. MARTIN to staff its new Shreveport office, which will deal with all phases of gas supplies. Mr. Foulds, a natural gas engineer, worked for the Transcontinental Gas Pipe Line Corp. and Mr. Martin, a geologist, was previously employed by Carter Oil Co.

R. E. Nagel

G. H. Dieter
. . . Fluor Corp.

J. J. McCART, former pipeline foreman of Panhandle Eastern Pipe Line Co.'s (Kansas City, Mo.) District No. 9, has replaced K. R. SPRINGER as the district foreman. Mr. Springer transferred to the foreman's job in District No. 6, Booneville, Mo., replacing JOHN E. STEWARD, and Mr. Steward took over W. C. SPELLMAN'S duties as foreman of District No. 1 at Stinnett, Texas. District No. 2 at Liberal, Kan., has been taken over by Mr. Spellman.

FRANK W. HARRIGER, superintendent of Cities Service Gas Co.'s Warrensburg, Mo., pipeline district, has retired after nearly 33 years of continuous service with the company and its predecessors. HARRY McDANIEL, Wichita district superintendent, has replaced Mr. Harriger, and K. A. KIMBALL has transferred from the Lawrence, Kan., district to Wichita. New superintendent at Lawrence is ED FITZPATRICK, former pipeline foreman at Kansas City.

GEORGE H. DIETER has been appointed general sales manager for the Fluor Corp. Ltd., Los Angeles, and R. E. NAGEL has been named assistant sales manager in charge of the company's Chicago sales office. Mr. Dieter has been associated with Fluor since 1940 and Mr. Nagel since 1945. The company also announced that P. D. MELLON, of the Calgary & Emerson Gas Co., will represent the Fluor Corp. in Canada. He will headquarter in Calgary.